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Family Odontophoridae (New World Quails)

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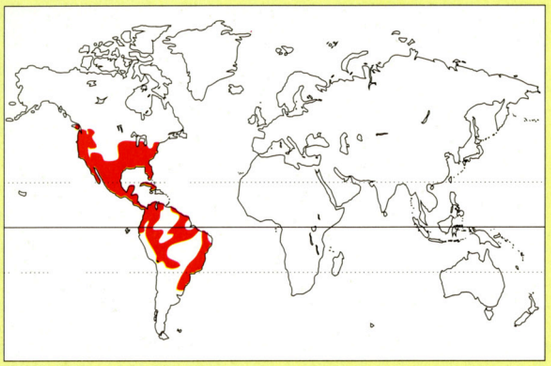
Class AVES

Order GALLIFORMES

Suborder PHASIANI

Family ODONTOPHORIDAE (NEW WORLD QUAILS)



- Fairly small terrestrial birds with compact body, strong legs, and short wings.
- 17-37 cm.

- Neotropical and Nearctic Regions.
- Tropical, subtropical and temperate forests, forest edge, savanna and agricultural land, from sea-level to 3300 m.
- 9 genera, 32 species, 139 taxa.
- 2 species threatened; none extinct since 1600.

Systematics

The New World quails are found primarily in the Neotropical Region and in the southern part of the Nearctic Region. The earliest fossil evidence is of a quail-like specimen found in Saskatchewan, Canada, dating to the Lower Oligocene some 37 million years ago, while there are also more recent fossils from the Miocene, Pliocene and Pleistocene. The earliest fossils of modern genera include a *Cyrtonyx* from the Middle Miocene in Nebraska (USA), about 16 million years ago, a possible *Lophortyx* (*Callipepla*) from the Middle Pliocene in Oregon, about 6 million years ago, and a *Colinus* from the Upper Pliocene of Kansas, 1·5-3·5 million years ago.

The taxonomic status of the family, and also of the genera and species within the family, has been debated for many years. The family is often considered a subfamily of Phasianidae, and thus it is grouped at various taxonomic levels alongside the Old World quails, partridges, francolins, and pheasants. However, DNA-DNA hybridization evidence suggests that the New World quails are not closely related to Old World quails, turkeys or grouse, indicating an early divergence in South America during its isolation from North America. The divergence of the New World quails is variously estimated to have occurred 63 or 35 million years ago, with DNA-DNA hybridization supporting the earlier of these dates. Further evidence in favour of family status for the New World quails comes from the fact that they are not known to have hybridized with any other members of Galliformes.

The presence of the most generalized species and the rich number of genera from southern Mexico and Guatemala suggest early radiation of the family from that region. Three groups of genera have been identified, with *Dendrortyx* being the earliest representative. The genera predominantly adapted to the forest, *Odontophorus*, *Rhynchortyx*, *Dactylortyx* and *Cyrtonyx*, are found in Central and South America, whereas the genera adapted to forest edge, *Colinus*, *Callipepla*, *Oreortyx* and *Philortyx*, are found primarily in North and Central America. This division into groups on habitat use is additionally supported by the pelvic structure.

Amongst the genera of New World quails, *Callipepla* and *Lophortyx* have often been classified apart, but nowadays the two forms are most commonly united in *Callipepla*, as the differences seem too slight to merit generic separation. R. J. Gutiérrez and others, using starch gel electrophoresis and fossil calibration, suggest, for the North American genera, the earliest radiation of *Oreortyx* some 12·6 million years ago, followed by *Colinus* 7 million years ago, and most recently by *Callipepla* 2·8 million years ago. They also suggest that *Dendrortyx* and *Odontophorus* diverged at least 16 million years ago.

The classification of species within genera has also varied greatly, and this issue is still very far from being settled. Of the nine genera in the family, *Odontophorus* has the greatest number of species, with a total of 15. However, there are two groups of *Odontophorus* wood-quails found in the northern Andes, which constitute a rusty-breasted complex of four species and a black-throated complex of five species; the members of these groups might actually turn out to represent smaller numbers of species. Several species in the genera *Callipepla*, *Colinus* and *Cyrtonyx* have also been merged by various authorities. A large number of natural hybrids have been reported among different species of *Callipepla*, and also with the Northern Bobwhite (*Colinus virginianus*). Although North American species have been analysed using a number of techniques, many South American species are presently classified with very little supporting evidence.

Morphological Aspects

The external appearance of the New World quails is very much like that of the Old World quails and partridges. In Latin America they are often lumped with the tinamous under the vernacular Spanish name "perdices". With their similar appearance, habitat and habits it is easy to mistake several species of these families where they occur together, even though they are not closely related.

The size range is not nearly as variable as that found in some of the other galliform families. The smallest species are the bobwhites (*Colinus*), the Barred Quail (*Philortyx fasciatus*), and the Tawny-faced Quail (*Rhynchortyx cinctus*), which are all slightly smaller than the average Northern Bobwhite. The largest species is the Long-tailed Tree-quail (*Dendrortyx macroura*), which is the size of a Grey Partridge (*Perdix perdix*).

The New World quails are small, compact birds, most of which have striking plumage, mainly in grey, black, white, buff, brown and reddish. Many species in the family have crests or other ornamental features on the head, such as the unusual teardrop-shaped plume found in Gambel's Quail and the California Quail (Callipepla californica). *These adornments are normally more developed in the male, and it is believed that they play an important part in breeding displays, as, in many species, does the sharply contrasted pattern of the head and throat. This individual also illustrates the ease with which New World quails can perch on the sharp spikes of cacti. These plants are common in the xeric habitats to which most of the North American species are so well adapted.*

[*Callipepla gambelii*, Sonoran Desert, Arizona, USA. Photo: John Cancalosi/ DRK]

Most species of New World quail show marked sexual dimorphism in their plumage. Females lack the more distinctive patterns, or at least these are much less conspicuous and differentiated. The crest, rounded and particularly prominent on the back of the head in the Montezuma Quail, is also normally less pronounced in the female.

[*Cyrtonyx montezumae mearnsi*, Davis Mountains, Texas, USA. Photo: C. C. Lockwood/ Bruce Coleman]

Almost all species are compactly built with a short neck, wings and tail. The exceptions are the three tree-quails (*Dendrortyx*), which have rather long tails. Several species have some form of ornamentation on the head, ranging from small crests, as commonly seen in the wood-quails (*Odontophorus*), to the long feathers in the shape of a teardrop found in California Quail (*Callipepla californica*), and the "spike" sported by the Mountain Quail (*Oreortyx pictus*). The bill is serrated, and, typical of seed-eaters, is short, stout and slightly decurved; it is especially short and stout in the wood-quails. In most species bill colour is black or grey, but two of the tree-quails have handsome red bills.

The ground-dwelling habits of most species are revealed by their short, powerful legs, as these are birds well designed for terrestrial locomotion. The tarsus is unfeathered and, unlike many of the Old World galliforms, none of these quails have tarsal spurs, in either sex. All species have three front toes and a raised hallux, or hind toe. The toes of many of the tropical species are especially long, which may be an adaptation for digging into the soil for roots and insects, rather than scratching in the litter for seeds, the norm for many of the more temperate species.

Although many species are powerful fliers over short distances, most apparently prefer to run rather than fly, when alarmed. When they do take to the air, they often start with a very steep take-off, but even then they usually fly only very short distances. As in other groups of Galliformes, the wingbeats are rapid, with alternating glides and little variation in direction. As most species live in groups, when alarmed birds will often explode from the ground in all directions, presenting a confusing spectacle to any potential predator.

Plumage colour ranges from very dull to a rather subtle spectacular. Most species have rather dull coloration and mottling, which is related to their shy, skulking behaviour. However, when viewed at close range, many species have striking red or purple eye-rings, or contrasting rows of white "teardrops" or spots on the breast. The Montezuma Quail (*Cyrtonyx montezumae*) exemplifies this contrast with a black base colour to the breast and belly covered extensively with brilliant white spots. Many species have strongly contrasted coloration on the face and throat, especially in males, and this probably performs functions in sexual displays.

There is some sexual dimorphism in plumage in almost all the species of this family. None, however, are as dramatic as the differences seen in several other Galliformes, notably some pheasants (see page 440). Typical sexual differences include the male being slightly larger, with slightly brighter plumage. Often, when a crest or some other form of ornamentation is present, it is larger in the male. A contrasting coloration in the region of the face and throat is often a dramatic black or white

The general appearance of the Odontophoridae is very similar to that of the Old World partridges, but there are some striking differences. One of these is the stronger, very pointed bill, which has more or less serrated edges, as can be seen in this Mountain Quail. This species is unique in the form of its crest, which consists of two immensely long, thin head plumes that often appear to be joined together in one.

[*Oreortyx pictus*, Western Mountains, USA. Photo: Erwin and Peggy Bauer/Bruce Coleman]

Many New World quails, such as the Northern Bobwhite, can fly quite strongly, with rapid wingbeats, but only for short distances. Unlike some Old World quails, no member of the Odontophoridae performs true migrations, but dispersive movements after breeding are typical, as are altitudinal movements in species which inhabit mountainous areas.

[*Colinus virginianus mexicanus*, Ohio, USA. Photo: Steve Maslowski/FLPA]

in the male, but a much duller buff or mottled brown in the female.

Plumage development is fairly consistent among all the different groups of galliforms. Feather tracts are similar and the presence of insulating aftershafts on contour feathers is common. Moult occurs in chicks at a very young age, when they are passing through a period of rapid development (see Breeding). Among well studied species, first-year birds are often distinguishable from older ones by the tendency for the outer two primaries on each wing to be pointed and frayed, as these two outermost flight-feathers are not moulted in the first year like all the others. The number of primaries is consistently ten, but the number of secondaries varies from 14 to 16, although these feathers grade into the scapulars, so that it is not always easy to make a clear separation.

Common to this group and other Galliformes is the presence of a blind sac in the cloaca called the bursa Fabricius. This structure, located on the dorsal wall of the cloaca, is larger in immature birds and decreases as the animal matures. It functions in antibody production, and has been used for ageing in a number of galliform species.

Habitat

The New World quails now inhabit a variety of ecosystems ranging from tropical rain forests to desert scrub. The group shows a strong preference for subtropical and mild temperate climates, and there is very limited representation in the colder temperate climates of North America. The Northern Bobwhite and the Mountain Quail range into cold climates, but even they can not tolerate the low temperatures endured by many of the Old World Phasianidae or the grouse (Tetraonidae).

The greatest diversity of species is associated with Neotropical forests. The wood-quails (*Odontophorus*), which represent almost half of the species in the family, are found in tropical rain forest, subtropical forest, montane and cloud forests, and deciduous forest. Most of the species in this genus are found in thick underbrush in these habitats, although a number of species can be found at forest edges and in second growth. Several species have been reported to use coffee plantations, but they appear to use coffee grown under bananas or other trees, rather than open fields of coffee.

The species found in North America are the best adapted to xeric conditions and, not surprisingly, to a temperate climate. Most still show their forest edge affinities, but several species are found in desert scrub and even in agricultural habitats. The bobwhites (*Colinus*) have also exploited more xeric ecosystems in Central America and northern South America. The Northern Bobwhite is one of the species that has adapted most fully to the temperate zone, where it utilizes both forest and open habitats. In the south-eastern USA, some of the densest populations are found in open pine woodlands with a well developed under-

New World quails use a very wide range of habitats. Most species inhabit various kinds of woodland, but some are well adapted to agricultural areas and even arid or semi-arid zones, as is the case of the Scaled Quail. The common name of this species comes from the dark edges to the feathers of the breast and mantle, which produce a shingled or scaly effect. Another distinctive characteristic of the species is its conspicuous white-tipped crest.

[*Callipepla squamata pallida*, Arizona, USA. Photo: John Shaw/NHPA]

Unlike the North American species of the family, which frequent open areas and even markedly arid zones, only one of the South American species, the Crested Bobwhite, favours this type of habitat. It is found in and around thickets, savanna, grassland, embankments, roadsides and cultivated land, but it does not enter the forest interior, although it can be found in the margins. All the other South American species are predominantly, or exclusively, forest dwellers.

[*Colinus cristatus parvicristatus*, La Ye, Apure, Venezuela. Photo: A. Greensmith/ Ardea]

storey of wiregrass (*Aristida stricta*). In the Midwest, populations are frequently associated with grassland and intensive agricultural ecosystems.

An interesting habitat adaptation is found in the Montezuma Quail and the Ocellated Quail (*Cyrtonyx ocellatus*). Both of these species are found in open pine or oak woodlands, but both depend heavily on the bulbs and tubers of a number of different types of herbaceous plants, most notably wood sorrels (*Oxalis*).

General Habits

The New World quails are shy and elusive, and they invariably prefer to hide and crouch in the vegetation, when alarmed, rather than flying away. If they do move off, many species are more likely to slip away unnoticed than to flush, but when a flock is flushed, take-off is often explosive, with birds flying off in many directions.

These are highly gregarious species, which regularly live in groups. After breeding, birds often move about in family groups, which consist of the two adults and their offspring. However, outside the breeding season, a number of temperate species, such as the California Quail, will congregate in large flocks, which can number up to 1000 individuals, when the conditions are suitable.

Most species are apparently diurnal, and are thought to spend the majority of their time on the ground. Indeed, all of the North American species live on the ground, and they generally roost on the ground at night. The tree-quails (*Dendrortyx*) of Central America are probably the most arboreal species, and at night they roost in tall trees; nevertheless, they are reported to feed mainly on the ground. Tree-roosting has also been reported for the Barred Quail, although this is essentially a species that occupies scrub. There are some accounts of Venezuelan Wood-quails (*Odontophorus columbianus*) roosting in rows along palm fronds, while it has also been claimed that the Chestnut Wood-quail (*Odontophorus hyperythrus*) roosts in trees. It seems that this habit might be more common in wood-quails than has been realized up to the present.

Voice

The rather primitive, poorly developed tracheal syrinx found in the Odontophoridae results in a rather simple vocal repertoire. However, despite this mechanical limitation, some species are reported to boast a fair number of distinct calls.

The Northern Bobwhite has a minimum of 19 distinct calls, and perhaps up to five others, whereas 10-14 different calls have been reported for the species of *Callipepla* found in the western USA. Most of the variation in types of call is related to the courtship behaviour of males, but other common calls in these species include various kinds of separation calls for re-grouping, feeding calls and alarm calls. Among the bobwhites, calls are often a whistle-like "bob-white", whence the common name. In contrast, the *Callipepla* quails have calls resembling shrieks and chipping sounds, as well as some whistles. The calls of tree-quails consist of a loud hooting and grunting, which is often performed in chorus. Amongst the wood-quails, calls tend to be rolling and guttural, and in south-western Colombia rural people call the Chestnut Wood-quail "aguacero vienteado", meaning "rain with wind", a description of the sound of its call.

In the cases where information is available, calls are most often concentrated around dawn and dusk, and with greater frequency during the breeding season. Group calls are found in a number of species, and in the Venezuelan Wood-quail these often become raucous choruses, with up to nine birds in a group. It is interesting to note that duetting has been reported among pairs of Marbled Wood-quails (*Odontophorus gujanensis*). This behaviour might be found to be more widespread among the wood-quails, when other species have been more fully studied.

Food and Feeding

Most of the species in this family tend to be generalists and opportunists in terms of the food they take. The long lists of types of food consumed that are available for several of the better studied species are testament to this lack of specializa-

tion. Many of the Central and South American species are in great need of more detailed studies of their food requirements.

The majority of species that are mainly adapted to living in xeric areas are seed-eaters, but most of them will also consume green vegetation, tubers, buds and insects. The tree-quails of Central America also consume a diversity of foods, but they are more likely to feed in trees than other genera, even though they too are reported to feed mostly on the ground. The wood-quails are reported to feed on a diversity of food types, but they may consume more animal food and roots. The Montezuma and Ocellated Quails, in turn, depend heavily on tubers.

Virtually all of the species in which the feeding habits have been studied show an increase in the consumption of insect and animal foods during the breeding season. This diet pattern is reported in many other species of Galliformes, and is attributed to the need for food with higher protein value during breeding. Again, in these same species the chicks have also been found to require insects during their first few weeks after hatching, when their growth rate is fastest.

Foraging patterns are rather diverse, reflecting the variety of food types consumed. The species inhabiting xeric parts of the western USA tend to peck at food rather than scratch for it, although most species will also scratch in the litter for seeds. These species are also more likely to eat green vegetation and succulents in order to procure water, a common tendency of animals living in such dry conditions. However, some species, such as the California Quail, are associated with standing water during the dry season.

The Montezuma and Ocellated Quails and also the wood-quails, all species that regularly eat tubers and roots, have long, powerful legs and toes, which are well suited for excavating soil. These species often forage in rows, clearing long paths through the leaf litter of their forest habitats. Tell-tale signs of wood-quails during the dry season are the rustling of leaves and flying litter, as a line of birds clears a path along the forest floor; the cleared areas often run along the edges of surface roots or rocks.

Breeding

The breeding biology of most of the Neotropical species of New World quails is neither well studied nor well understood, and a good deal of the very limited information available is anecdotal. Much more research is required on the diversity of reproductive patterns in this interesting group. In this aspect, as in most others, the vast majority of what is known refers to the species found in the USA.

Most species are apparently monogamous, although there are indications that this might not necessarily be the case for some wood-quails. As is to be expected, those species inhabiting temperate areas tend to breed in spring and early summer, with laying mostly from about April onwards. The season is rather more variable in the tropics, but typically coincides with the local wet season.

Courtship displays in North American species incorporate a number of frontal and lateral postures by males. These can include the use of the brightly coloured throat or the crest, while the wings are often dropped or spread. "Tid-bitting" (see page 458) is common, and calls are often used in conjunction with visual displays. Nonetheless, most of the courtship activities of the New World quails are not nearly as dramatic as many of their galliform relatives.

The nest is almost always made on the ground, and it usually consists simply of a shallow depression lined with vegetation. It is most often hidden from above by thick vegetation, but some of the wood-quails actually construct domed nests with a long tunnel entrance.

As in most of the Galliformes, clutch size is considerably larger than in most other groups of birds. Typical clutch size is about 10-15 eggs for bobwhites and other North American species, as well as their congeners, but 3-6 eggs might be more typical of the tree-quails and wood-quails of Central and South America. For a few well studied species, such as the Northern Bobwhite, there are records of intraspecific brood parasitism, with one or more females laying in another female's nest. It is

The flowers and sweet fruit of the saguaro constitute an important food source for those species, such as Gambel's Quail, that are found in the semi-deserts where this cactus thrives. However, the diet of this quail species is actually quite varied and includes seeds, flowers and fruits of many plants, as well as assorted grasses. In contrast, for the Gila Woodpecker (Melanerpes uropygialis)*, seen here in the background, the fruit of the saguaro, when available, is its main source of food.*

[*Callipepla gambelii*. Photo: François Gohier/Ardea]

Northern Bobwhites generally form coveys, except early in the breeding season, when they are found in pairs. At the beginning of the summer the covey is made up of the family group, including both of the adults and the chicks. Other birds gradually join, from other coveys which have been decimated by predation or disease, or birds that have, for various reasons, become isolated. At the beginning of autumn, it is common for the coveys to begin to mingle, with many birds swapping covey affiliation in a process known as the "fall shuffle". Finally, in spring, the coveys disperse, as birds pair off in preparation for breeding.

[*Colinus virginianus*. Photo: Leonard Lee Rue/ FLPA]

interesting to note the presence of brown or red spots on the mainly whitish eggs of many of the Neotropical species: because the breeding season of these species often coincides with the wet season, there is the potential for the leaching of colour onto the shells, and it seems that these spots are thus the result of staining by the vegetation or soil in the nest. The California Quail and Gambel's Quail (*Callipepla gambelii*) are both known to lay a second clutch on occasions.

The incubation period appears to vary widely among the different species, but it should be noted that in several cases where estimates are available for a particular species, the data have actually been collected from very few individual clutches. For the better known species, incubation ranges from 21-23 days in *Colinus* and *Callipepla*, to 25-26 days in *Cyrtonyx*. Among the poorly studied wood-quails, reports include estimates of 16-17 days for the Black-breasted Wood-quail (*Odontophorus leucolaemus*), 18-19 or 26-27 days for the Spot-winged Wood-quail (*Odontophorus capueira*), 24-28 days for the Marbled Wood-quail, and 30 days for the Venezuelan Wood-quail.

Chicks are nidifugous, and, soon after hatching, wander off from the nest guarded by the female or both adults in a family group. At this stage, the chicks grow very rapidly, and the primaries and secondaries are acquired early on, so that the chicks of some species are capable of short flights at less than 14 days of age.

The amount of male parental care varies with the species. Male assistance during incubation has been reported in some cases, especially in the latter stages and around the time of hatching. As the breeding biology of more species becomes better known, so male assistance with the tasks of incubation and brood-rearing will undoubtedly be more commonly reported. In some of the wood-quails, there are reports of guarding behaviour near the nest by adults other than the parental pair, but this anecdotal information needs to be confirmed by more intensive studies.

The New World quails are generally species with short lives, high mortality, and high reproductive rates. Annual survival rates of the better studied species in the USA very rarely top 30%. Nesting success rates of 20-40% are commonly reported for the Northern Bobwhite, but adults are persistent renesters. Brood mortality is often over 20%, and losses of even 30-50% are not uncommon, with the result that life expectancy is usually under one year. It is not surprising then that the productivity of these species is very high. There is a trend toward smaller clutch sizes in the forest-adapted species found in Central and South America; there are virtually no estimates of lifespan and mortality rates for those species, but with the much lower productivity rates, it would not be surprising if there were greater adult survivorship.

Movements

The major mode of movement for the species in this group is walking, and this is consistent with the idea that virtually all species would be considered sedentary. Home range is very small, typically under 40 hectares among the better studied species found in the USA.

Altitudinal migration has been reported in the Mountain Quail and it is suspected in the Spotted Wood-quail (*Odontophorus guttatus*), but there is no evidence of similar movements in other species. The most mobile species in this family are the Scaled Quail (*Callipepla squamata*), which has been known to move up to 100 km, and the Mountain Quail, with reported movements of over 50 km. However, these types of movement are probably exceptional, and the sort of distances more typical travelled by Scaled Quails are of less than two kilometres.

Relationship with Man

Like most of the other galliforms, the New World quails have a long history of association with man. This association has been both beneficial and detrimental at times, depending on the perceived value of the particular species and the land use practices.

Pre-Columbian cultures in North and South America utilized a number of different species of quails as food sources. In some of these cultures, there were periods when the potential for overexploitation existed. Alterations of habitat were at times liable to have a negative impact on some species, and at the same time positive effécts on others. Mayan agriculture in

It appears that the Spot-winged Wood-quail is monogamous, at any rate in captivity. On the left of this photo is the characteristic nest of this species, a shelter built on the ground of dry leaves, with a side entrance and a substantial roof which prevents the white eggs from being seen from above. Also clearly visible here are the bright red eye-ring and the broad tawny orange supercilium, the most distinctive features of this species.

[*Odontophorus capueira*, Brazil.
Photo: R. Seitre/Bios]

southern Mexico and northern Central America consisted of a mosaic of *milpas* in forest areas and raised bed agriculture in lowlands. This had the potential of increasing the populations and distribution of both the Northern Bobwhite and the Black-throated Bobwhite (*Colinus nigrogularis*), but it might equally have been detrimental to forest-dwelling quails. Very dense human populations in the region at the same time may well have taxed quail stocks.

In North America, native tribes in the east were known for using fire to alter the expansive forest ecosystems. The Northern Bobwhite no doubt benefited from these habitat alterations, but, nevertheless, evidence suggests that this species was not an important food item. In western North America, the California Quail was highly esteemed as a source of food by the native tribes, and the "top-knot" was used for decoration on clothing. It has been suggested that the population of California Quails on the island of Santa Catalina, off Los Angeles (USA), was originally introduced by local Indians, and certainly there is evidence of rural peoples in Latin America having kept several quail species as pets. One problem with our understanding of quail use throughout history is that even today there is little distinction made between the quails, tinamous and cracids of the region.

The combined factors of European settlement in the New World, fairly dramatic changes in the landscape, and interest in quails for sport and food have led to the distributions and populations of species that we find nowadays. The extensive logging and then reafforestation of the eastern USA since the seventeenth century has had a dramatic impact on the distribution and populations of the Northern Bobwhite. This species was very important during the eras of settlement and hunting for markets, and it probably suffered periodically as a result of these pressures. Despite market hunting pressure, populations are thought to have increased generally in the USA until the middle to late nineteenth century, due to forest clearing; most of the population declines have, in fact, occurred during the latter half of the twentieth century. A similar pattern of population change has also been described for the California Quail. Both of these species and the other quails in the western USA are presently important in the business of hunting for sport, and in some areas extensive management is carried out for these species.

The early impacts of European settlers on other North American quails were probably considerably less significant, but they too were no doubt heavily harvested during settlement. Exploitation of quails in Latin America during and after European settlement probably paralleled the North American situation, but it is less well documented. Although many species of quails are considered eminently edible in Latin America, their small body size limits demand. It is interesting to note that in south-west Colombia the Crested Bobwhite (*Colinus cristatus*) is said to be "maldito" and should not be eaten; this translates to "cursed" or "damned", in reference to the Virgin Mary being frightened when she flushed a covey of Crested Bobwhites! There is some hunting for sport, especially for the bobwhites, in agricultural areas of northern South America, and, in connection with this, some hunting regulations do exist in a few countries.

Several species of New World quails have been widely transplanted within the region and also to other parts of the world. The Northern Bobwhite and the California Quail have been extensively relocated, both from wild-trapped birds and from those raised in captivity, and it has now been suggested that the decline of the Northern Bobwhite in the north-eastern USA may have been accelerated by the release of large numbers of southern and pen-raised quails.

Both the Northern Bobwhite and the California Quail are naturalized well beyond their natural ranges. The California Quail is well established in New Zealand and Argentina, while the Northern Bobwhite is well established in several parts of the western USA, and in limited numbers in New Zealand. From South America, the Crested Bobwhite has been introduced and is now established on several Caribbean islands. Most of the other North American species have been introduced at one time or another in other parts of the USA, Europe, New Zealand and Australia, though generally without success.

Several of the New World quails are represented in some zoos or private collections, although they are generally not as popular as some of their galliform relatives. For example, specimens of many of the wood-quails can be found in one or more South American zoos, but most of these collections are small, containing only one to a few birds. Apart from a few North American species, members of Odontophoridae are rarely bred in captivity. The exception might be some of the

Although several other New World quail species seem to be able to get by with succulent plants, the California Quail selects its dry season habitat in accordance with its need for springs, streams, irrigation ditches or other permanent sources of drinking water. While incubation is carried out only by the female, the male, here partly hidden by the female, also participates in the care and guarding of the chicks.

[*Callipepla californica*. Photo: Wardene Weisser/ Ardea]

collections of bobwhites found in Latin America, where there are reports of commercial breeding for eggs and for release.

Status and Conservation

The current status of the New World quails ranges from a species that may be critically endangered to others which are common and widespread. In order to detect any serious declines before it is too late to act, efforts are being made to determine the current situation and conservation requirements of all species, and this has been the main aim of the Conservation Assessment project (see page 472).

All of the better known species, those found predominantly in the USA, are widespread and common. Several of these species are widely hunted on a sustainable basis, and some are intensively managed for hunting, notably Northern Bobwhites, of which over 20 million are killed in the USA each year. But there is now concern regarding the trends in some populations of these species. Although populations of the Northern Bobwhite in the southern plains of the USA are stable to increasing, populations in traditional areas of the south-eastern and north-eastern USA have been undergoing a rather dramatic long-term decline. Much of this decline has been attributed, at least in part, to changes in land use. In the south-east, forestry practices directed towards the short-term rotational clear-cutting of pines are detrimental to populations. More traditional selective cutting and understorey burning, creating open pine woodlands with a grass understorey, result in much higher populations of quails. In the western USA, populations of California Quails and Scaled Quails have dwindled since 1960. The Mountain Quail has declined dramatically in the north-eastern portion of its range, but overall populations are stable.

Although Mexico contains the greatest diversity of quail species, including all of the species also found in the USA, very little is known about the conservation status of any of the species. Of the 11 polytypic species with ranges including Mexico, 60 of the 85 subspecies described are present in Mexico. Even for the well studied Northern Bobwhite, little is known about Mexican populations, although 16 of the 22 subspecies are found there. An isolated subspecies, the Masked Bobwhite (*C. v. ridgwayi*) has only recently been studied in Mexico.

Among the species more adapted to xeric conditions, overgrazing can create problems by reducing both the vertical structure of the vegetation and the food supplies, although many of these species actually undergo population increases when their habitat is under light or moderate grazing by livestock. Livestock can even have impact on forest species, such as the Montezuma and Ocellated Quails, where grazing in the forest reduces the availability of important food plants.

Very little information is available for most of the forest-dwelling species of Central and South America. The Bearded Tree-quail (*Dendrortyx barbatus*) is considered the most critically threatened species in this group. Its former distribution was in the cloud forests of eastern Mexico, but these have now mostly been cleared. Surveys in the late 1980's revealed some populations, but these were not found again during subsequent searches in the 1990's; more intensive surveys for this species are planned for 1994. The other species currently considered to be seriously threatened is the Gorgeted Wood-quail (*Odontophorus strophium*). This species was found in montane oak forests in the eastern Andes of central Colombia. A survey in the 1980's located populations in the vicinity of Virolín, Santander Department, and efforts have subsequently been made to establish a reserve there.

Several species of wood-quails are reckoned to be near-threatened mainly on the basis of their limited distributions, in conjunction with alterations of their habitat that are known to be occurring. Unfortunately, not enough is really known about many species to enable very accurate conservation assessments to be made. Nevertheless, the conversion of forest to agriculture in many parts of Central and South America must be considered a threat to many of these species, although it is not yet known how tolerant most species are to the fragmentation of the forest, or how well they can adapt themselves to use second-growth forest. The inconclusive evidence of scattered observations suggests that several species will utilize shaded fields of coffee, but not those plantations that lack the shade trees. However, at the same time there may also be some reason for concern about the possible impact that the pesticides used in the cultivation of coffee could have on these species.

The Long-tailed Tree-quail and the other two species of the genus Dendrortyx *are, as their name suggests, the most arboreal members of the family. They roost in trees, sometimes at great heights, although they feed mainly on the ground. They are the largest of the New World quails, with the longest tails. Six subspecies have been described for the Long-tailed Tree-quail, all of them endemic to Mexico.*

[*Dendrortyx macroura*, Mexico. Photo: Patricio Robles Gil]

Fortunately for a number of species with restricted ranges, such as the Venezuelan and Chestnut Wood-quails, there are national parks and reserves to protect some remaining habitat, but these isolated patches of suitable habitat are ever vulnerable to catastrophes, so that the status of these quails hangs in the balance. In addition, the distribution of parks and reserves is uneven in many zones: for example, in the western Andes several national parks help protect some of the remaining tracts of cloud forest, but there is little protection for forests at lower altitudes, and virtually no protection in the lower river valleys.

Although deforestation and agriculture may be considered the major threats to the forest quails, several other threats that are present might be important in some areas, for instance urbanization and hunting, which could both affect populations of quails. To date, outside the USA, no studies have been carried out concerning the impacts of hunting on quail numbers. There is widespread but rather sporadic hunting of quails by indigenous peoples throughout much of Central and South America. Fortunately for the quails, the combination of their small size and the presence of many alternative prey species means that quails are often not considered worth the cost of a shotgun shell. The effects that hunting pressure might have on quail populations in the future, as alternative prey species decline due to deforestation, remain to be seen, but it is clear that the threat may well increase.

The Bearded Tree-quail is the most seriously threatened member of the family. It is thought to be in a critical situation, and its total population may not reach 1000 birds. Destruction of its forest habitat within its restricted range appears to be the main cause of its decline, although hunting and trapping have also played their parts. This bird was acquired with various other birds in a local market in Hidalgo, Mexico, in 1992.

[*Dendrortyx barbatus*, Mexico. Photo: Josep del Hoyo/ Lynx]

In addition to the rather intensively managed species in the USA, there are several other species that are apparently experiencing increases in terms of both population and distribution, due to the activities of humans. For instance, as a result of deforestation, the Crested Bobwhite has recently expanded its range into Costa Rica, where it may now be coming into contact with the Spot-bellied Bobwhite (*Colinus leucopogon*). The Crested Bobwhite is very common in the *llanos* of Venezuela and in parts of the major river valleys of Colombia, while the Spot-bellied Bobwhite is likewise common in Costa Rica. Nevertheless, there is some concern even for these species, which parallels the concerns for Galliformes inhabiting agricultural ecosystems in other parts of the world. The impacts of agricultural intensification and of the abundant use of pesticides are still unknown in this region, but they could prove to be very important.

Despite the existence of such threats, the first step that must be taken towards assuring the future of many of the Neotropical species involves a throrough study of the ecology, and in particular the habitat use, of such species. The paucity of data currently available on distribution, populations and precise habitat requirements limits the possibilities of making accurate conservation assessments and recommendations.

General Bibliography

Alderton (1992), Brodkorb (1964), Carroll, Church & Kelsev (1994), Carroll, Kuvlesky *et al.* (1994), Delacour & Ridley (1985), Gutiérrez (1993), Gutiérrez *et al.* (1983), Johnsgard (1988), Kuroda (1970), McGowan, Carroll & Ellis-Joseph (1994), Peters (1934), Prager & Wilson (1976), Raethel (1988), Robbins (1981), Rutgers & Norris (1970), Sibley & Ahlquist (1990), Sibley & Monroe (1990), Sibley *et al.* (1988), Stock & Bunch (1982), Vaughan (1990), Verhegen (1956).

PLATE 39

inches 6
cm 15

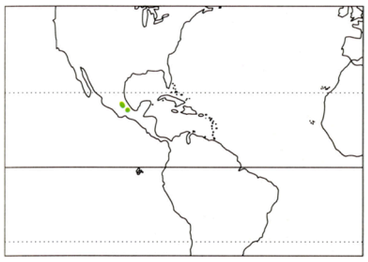
Genus *DENDRORTYX* Gould, 1844

1. Bearded Tree-quail

Dendrortyx barbatus

French: Colin barbu **German**: Bartwachtel **Spanish**: Colín Barbudo
Other common names: Bearded Tree-partridge/Wood-partridge

Taxonomy. *Dendrortyx barbatus* Gould, 1846, Jalapa, Veracruz, Mexico.
Monotypic.
Distribution. EC Mexico. Formerly in Sierra Madre Oriental, from S San Luis Potosí to C Veracruz and Puebla; recently known only from Hidalgo.



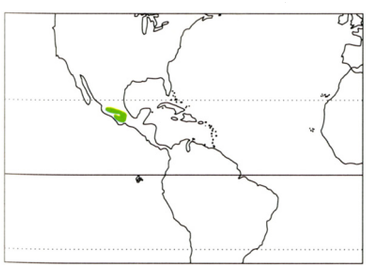
Descriptive notes. 22-32 cm; estimated weight of male 459 g, of female 405 g. Tail longer in *Dendrortyx* than in other members of family; much shorter in present species than in congeners. Overall coloration reddish brown, with breast rufous cinnamon; cheeks, throat and upper breast bluish grey. Crown and short crest buffy brown; eyering, bill and legs red. Female smaller, with shorter tail. Immature has dark brown barring on flanks, and duller breast.
Habitat. Cloud forests and adjacent pine and oak forests at 1200-2200 m; local reports claim species was formerly present in Hidalgo in primary forest remnants at elevations of less than 915 m. Other reports indicate that birds can visit planted fields in forest clearings, when black beans ripening; known to use second growth forest, forest edge, gardens and bean plantations. Roosts above ground in trees.
Food and Feeding. One stomach contained fruit and seeds. Captive birds ate black beans and corn; also soft fruits, such as grapes and bananas. May eat ripe black beans in wild.
Breeding. Nesting season may be Apr-Jun; female with downy chicks recorded in Jun. Brood of 5 chicks said to have been captured in wild. In captivity, birds constructed nest in shallow depression with palm leaves. Eggs dull white, averaging 46·6 x 31·0 mm; incubation 28-30 days in captivity.
Movements. Presumably sedentary.
Status and Conservation. ENDANGERED. Mace-Lande: Critical. Restricted range; very little information available, but situation reckoned to be serious, as locally extinct in parts of range and severely threatened elsewhere. Total population might number less than 1000 birds; apparently still decreasing; locally common in small areas. Not recorded from San Luis Potosí since 1951, nor from Veracruz since 1968. Several patches of suitable habitat remain, where populations might occur, but most of cloud forest in former range now completely deforested. Main threats are rapid deforestation and hunting; illegally hunted and poisoned in places because of depredation on beans; sometimes trapped for sale in local markets. Three national parks in Veracruz include areas where species known to have occurred, but not recorded in recent years. Urgently requires research, surveys and conservation action in order to halt potential extinction.
Bibliography. Alderton (1992), Blake (1953), Collar & Andrew (1988), Collar *et al.* (1992), Davis (1952, 1972), Edwards (1989), Howell & Webb (1992b), Johnsgard (1973, 1988), Leopold (1959), Lowery & Newman (1951), Martin (1955), Ridgway & Friedmann (1946), Robbins (1981).

2. Long-tailed Tree-quail

Dendrortyx macroura

French: Colin à longue queue **German**: Langschwanzwachtel **Spanish**: Colín Rabudo
Other common names: Long-tailed Tree-partridge/Wood-partridge

Taxonomy. *Ortyx macroura* Jardine and Selby, 1828, Mexico = Valley of Mexico.
Six subspecies recognized.
Subspecies and Distribution.
D. m. macroura (Jardine & Selby, 1828) - México (state) and Veracruz, EC Mexico.
D. m. diversus Friedmann, 1943 - NW Jalisco, WC Mexico.
D. m. griseipectus Nelson, 1897 - Pacific slope in México, Distrito Federal and Morelos, C Mexico.
D. m. striatus Nelson, 1897 - S Jalisco, Michoacán and Guerrero, WC Mexico.
D. m. inesperatus Phillips, 1966 - Chilbancingo and Guerrero, S Mexico.
D. m. oaxacae Nelson, 1897 - W Oaxaca, S Mexico.



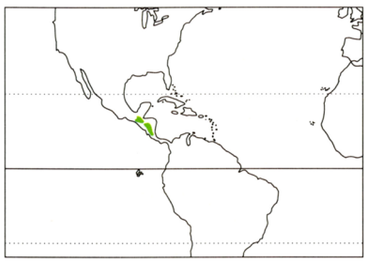
Descriptive notes. 29-37 cm; 350-465 g (unsexed), with male c. 450 g, female 374-446 g. Very long tail. Forehead, sides of head, throat and foreneck black; two white streaks above and below eye. Overall coloration chestnut and grey; breast bluish grey; upper back chestnut with wide grey margins; pale markings on wings and tail. Crown and short crest black with buff streaks; eyering, bill and legs red. Female smaller, with shorter tail. Immature spotted with dark brown on underside; less chestnut on breast. Races separated on coloration, notably of rump and breast; *oaxacae* has breast too boldly marked chestnut.
Habitat. Montane oak and pine forest and cloud forest at 1500-3300 m. Most often in dense undergrowth.
Food and Feeding. Feeds on flowers, flower buds, small fruits and seeds. One crop contained various legumes, especially *Desmodium*. Scratches in leaf litter and humus, but also feeds in trees.
Breeding. Nesting season from late Apr, possibly to Dec. Two nests associated with rocky outcrops, another found at base of shrub; one nest (amongst rocks) covered by leaves and twigs from fallen tree, but other two not covered. Three clutches of 4 eggs; one with 6 eggs, but possibly referring to 2 females. Eggs pale cream with light brown spots, averaging 49·2 x 33·5 mm.
Movements. Sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Status generally unknown; total population might number in region of 20,000-200,000 birds; possibly decreasing. Probably suffers habitat loss and some hunting pressure, but apparently not at risk. Extensive surveys required.
Bibliography. Alderton (1992), Biggs (1954), Binford (1989), Blake (1953), Davis (1972), Edwards (1989), Johnsgard (1973, 1988), Leopold (1959), Phillips (1966), Pitelka (1948), Ridgway & Friedmann (1946), Rowley (1966, 1984), Schaldach (1963), Skutch (1947b), Warner (1959), Zimmerman & Harry (1951).

3. Buffy-crowned Tree-quail

Dendrortyx leucophrys

French: Colin à sourcils blancs **German**: Guatemalawachtel **Spanish**: Colín Cariclaro
Other common names: Buffy-crowned Tree-partridge, Highland Wood-partridge, Buff-fronted Quail

Taxonomy. *Ortyx leucophrys* Gould, 1844, Cobán, Vera Paz, Guatemala.
Race *hypospodius* has been considered separate species. Birds of Honduras and Nicaragua formerly awarded separate race, *nicaraguae*, but now included in nominate *leucophrys*. Two subspecies recognized.
Subspecies and Distribution.
D. l. leucophrys (Gould, 1844) - S Mexico (Chiapas), Guatemala, Honduras, E El Salvador and W Nicaragua.
D. l. hypospodius Salvin, 1896 - N Costa Rica.



Descriptive notes. 32-35·5 cm; estimated weight of male 397 g, of female 340 g. Forecrown, supercilium, chin and throat white; earcoverts black. Overall coloration chestnut and grey; breast and belly blue-grey with chestnut streaks. Crown, short crest and hindneck chestnut. Bare red eyering more elongated than in other *Dendrortyx*; bill black, legs orange-red. Female smaller, with shorter tail. Immature has buffy tips to greater primary coverts. Race *hypospodius* larger, rather darker and greyer, especially on underparts.
Habitat. Montane oak and pine forest and cloud forest at 300-2900 m. Found in second growth and occasionally in coffee plantations. Roosts above ground in trees.
Food and Feeding. Seeds, flower buds and small fruits, including drupes. Has been observed scratching in oak leaf litter on forest floor.
Breeding. Recorded in May in Guatemala, Feb-Mar in El Salvador; chicks half-grown during Apr-Jul, Jun-Sept in Costa Rica. Possibly 4-5 eggs. Eggs reddish buff with reddish brown spots, averaging 44 x 30 mm.
Movements. Apparently sedentary. Moves about in coveys of 4-6 birds, but up to 12 during non-breeding season.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Virtually nothing known; total population might number in region of 20,000-200,000 birds; possibly decreasing. Deforestation may be a threat in some parts of range; some trapping known to occur. Extensive surveys required.
Bibliography. Alderton (1992), Baepler (1962), Blake (1953, 1977), Dickerman (1987b), Dickey & van Rossem (1938), Edwards (1989), Griscom (1932), Johnsgard (1973, 1988), Land (1970), Leopold (1959), Monroe (1968), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Saunders *et al.* (1950), Slud (1964), Stiles & Skutch (1989), Wagner (1953), Wetmore (1941).

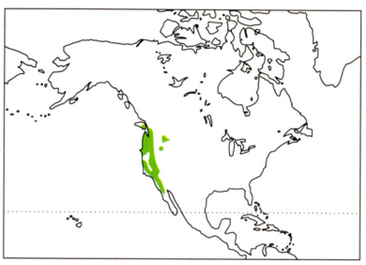
Genus *OREORTYX* Baird, 1858

4. Mountain Quail

Oreortyx pictus

French: Colin des montagnes **German**: Bergwachtel **Spanish**: Colín Serrano

Taxonomy. *Ortyx picta* Douglas, 1829, New California = Linn Co., Oregon, USA.
Race *palmeri* considered synonymous with nominate. Five subspecies recognized.
Subspecies and Distribution.
O. p. pictus (Douglas, 1829) - SW Washington to C California, W USA; also (probably introduced) Vancouver I, SW Canada, and W Washington, NW USA.
O. p. plumiferus (Gould, 1938) - S Washington to W Nevada and NE & NC California, W USA.
O. p. russelli Miller, 1946 - S California, W USA.
O. p. eremophila van Rossem, 1937 - S & WC California and SW Nevada, W USA, to extreme N Baja California, NW Mexico.
O. p. confinis Anthony, 1889 - N Baja California, Mexico.
Introduced locally in W Idaho, NW USA, where may be native too.



Descriptive notes. 26-28 cm; 200-290 g, with sexes apparently similar. Largest quail of North America. Long black sword-shaped crest highly distinctive. White eyeline continuing onto throat; chin and throat cinnamon. Overall coloration dark blue-grey; belly chestnut with white streaks on flanks; flight-feathers with white margin. Bill black, legs brown. Female similar, with smaller crest. Immature has buff-tipped greater primary coverts. Races separated on coloration, mainly of back and breast.
Habitat. Variable, depending on population: mixed evergreen forest and chaparral; brushy oak and manzanita; forest edge; brushy thickets; and farms. During summer occurs at 500-3000 m, generally lower during winter. Found at higher altitude and on steeper slopes than sympatric populations of *Callipepla californica*.
Food and Feeding. Mainly seeds and bulbs, but also fruits, flowers and green herbage. Most important plant items in California include *Lithophragma*, *Quercus*, *Stellaria*, *Erodium*, *Trifolium* and *Rhus*. Few arthropods taken even by young chicks. Foraging methods recorded include scratching in litter, digging, jumping, acorn shelling and tree climbing. Standing water required.
Breeding. Mar-Jul, occurring earlier in S, later in N; peak hatching May-Jun. Nests located under branches or shrubs, close to water. Clutch size 9-10; Eggs pale reddish buff, averaging 34·5 x 26·5 mm.

On following pages: 5. Scaled Quail (*Callipepla squamata*); 6. Elegant Quail (*Callipepla douglasii*); 7. California Quail (*Callipepla californica*); 8. Gambel's Quail (*Callipepla gambelii*); 9. Barred Quail (*Philortyx fasciatus*); 10. Northern Bobwhite (*Colinus virginianus*).

Incubation 21-25 days; carried out by female, but some evidence of male assistance. Brood may be raised by either adult of pair or by both; no evidence to date of any birds laying second clutch.
Movements. Less sedentary than other related species; evidence of altitudinal migrations of over 50 km in some populations. Coveys probably comprise family groups; normally 5-9 birds, but up to 20.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Overall population levels stable, probably numbering over 1,000,000 birds. Important gamebird in W USA: widespread local declines and extinctions in NE portion of range, e.g. only three small populations left in Idaho. In areas with population declines, major threats include construction of dams and impoundments, agricultural conversion and grazing. In Mexico, threatened by overgrazing.
Bibliography. Alderton (1992), Blake (1953), Block *et al.* (1984, 1991), Brennan (1985, 1990, 1991a), Brennan & Block (1985, 1986), Brennan *et al.* (1985, 1986, 1987), Browning (1977), Church & Dailey (1993), Edwards (1989), Grinnell *et al.* (1918), Gutiérrez (1975, 1980), Gutiérrez *et al.* (1983), Johnsgard (1973, 1975), Leopold (1959), Lever (1987), McLean (1930), Ormiston (1966), Pine (1981), Ridgway & Friedmann (1946), van Rossem (1937), Terres (1980), Yocom & Harris (1953).

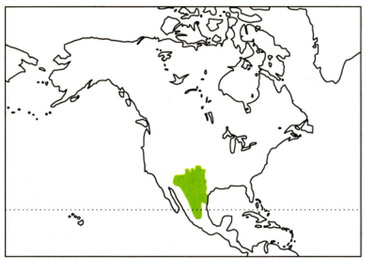
Genus *CALLIPEPLA* Wagler, 1832

5. Scaled Quail

Callipepla squamata

French: Colin écaillé **German**: Schuppenwachtel **Spanish**: Colín Escamado
Other common names: Blue Quail

Taxonomy. *Ortyx squamatus* Vigors, 1830, interior of Mexico.
Sometimes considered conspecific with *C. douglasii*. Four subspecies recognized.
Subspecies and Distribution.
C. s. hargravi Rea, 1973 - SE Colorado, SW Kansas, N New Mexico, W Oklahoma and NW Texas, WC USA.
C. s. pallida Brewster, 1881 - S Arizona, S New Mexico and W Texas, SC USA, to N Chihuahua and N Sonora, NW Mexico.
C. s. squamata (Vigors, 1830) - N Sonora and N Tamaulipas S to Valley of Mexico, Mexico.
C. s. castanogastris Brewster, 1883 - S Texas, S USA, and NE Mexico.
Introduced to C Washington and Nevada, W USA.



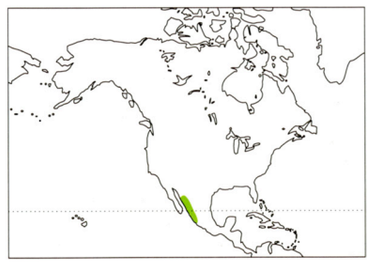
Descriptive notes. 22-29 cm; 151-202 g, with sexes apparently similar. Distinctive short, bushy crest is mainly buff to white, with white tip (cottontop). Overall coloration blue-grey. Back, breast and belly blue-grey, fading to buff below, with black feather tips, producing scaly appearance; buff or white streaks on folded wing and flanks. Bill black, legs greyish black. Female has smaller crest; brown streaks on face and throat. Immature has greater primary coverts tipped with buff. Races separated in tone of grey on upperparts, darker in *castanogastris*, paler in *pallida*; also in colour of belly, chestnut in *castanogastris*.
Habitat. Desert scrub and grasslands; prefers some variation, and avoids uninterrupted stretches of grassland. Often occurs where standing water available.
Food and Feeding. Takes wide variety of food types, especially seeds, insects and green herbage. In Texas, commonest items were seeds of honey mesquite, sunflowers, common Russian thistle and sorghum, herbage of lanceleaf krameria and milkvetch, and insects such as grasshoppers and beetles. In Mexico, takes seeds of *Bidens*, corn cockle, *Croton*, foxtail, *Panicum* and Johnson grass. Fruits of *Atriplex* and *Mahonia* also eaten.
Breeding. Jun-Oct (rainy season). Nests located under shrubby vegetation e.g. soapweed or sand sage, and other grasses or forbs. Clutch size averages 12·7-14 in USA; average 12 eggs (9-16) in Mexico. Eggs dull white with brown or white speckling, averaging 32·5 x 25·0 mm. Incubation 21-23 days, by female; assistance by male extremely rare. Double-clutching reported. Average brood size in USA 7·8-11·5.
Movements. Sedentary; birds generally move about less than 2 km, although some movements of over 100 km reported. Moves about in coveys, normally of 10-40 birds, but sometimes up to 200. Home range of 10-34 ha.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Total population probably numbers over 1,000,000 birds. Important gamebird in SW USA; has declined rather dramatically in USA since 1960. Mesquite control detrimental to populations. Has benefited from clearing of pine and oak forest in Mexico, and also from overgrazing in past.
Bibliography. Anderson (1978), Ault & Stormer (1983), Blake (1953), Brown, D.E. (1989), Cain *et al.* (1987), Campbell, D.K. *et al.* (1973), Campbell, H. (1968), Campbell, H. & Harris (1965), Campbell-Kissock *et al.* (1985), Church & Dailey (1993), Davis *et al.* (1975), Dixon (1959), Edwards (1989), Figge (1946), Fleming & Baker (1963), Hammerquist-Wilson *et al.* (1987), Hoffman (1965), Johnsgard (1973, 1975), Kelso (1937), Lehmann (1984), Lehmann & Ward (1941), Leopold (1959), Ligon (1961), McCabe (1954), Medina (1988), Rea (1973), Ridgway & Friedmann (1946), van Rossem (1945), Russell (1932), Saunders & Parrish (1987), Schemnitz (1959, 1961, 1964), Smith & Cain (1984), Stormer (1984), Terres (1980), Urban (1959), Wallmo (1956a, 1956b, 1957).

6. Elegant Quail

Callipepla douglasii

French: Colin élégant **German**: Douglaswachtel **Spanish**: Colín Elegante
Other common names: Douglas Quail

Taxonomy. *Ortyx Douglasii* Vigors, 1829, Mazatlán, Sonora, Mexico.
Often placed in *Lophortyx*. Sometimes considered conspecific with *C. squamata*. Some debate over status and relationship of races *douglasii* and *impedita*; validity of *languens* also questionable. Five subspecies normally recognized.
Subspecies and Distribution.
C. d. bensoni Ridgway, 1887 - Sonora, NW Mexico.
C. d. languens (Friedmann, 1943) - W Chihuahua, NW Mexico.
C. d. douglasii (Vigors, 1829) - S Sonora, Sinaloa, NW Durango and N Nayarit, W Mexico.
C. d. impedita (Friedmann, 1943) - C & S Nayarit, W Mexico.
C. d. teres (Friedmann, 1943) - NW Jalisco, WC Mexico.
Descriptive notes. 22-24 cm; 160-190 g. Males slightly larger. Long vertical crest is orange buff in male. Overall coloration blue-grey. Crown, sides of head and neck and throat grey with black streaks. Lower breast and belly grey with rows of white spots with black margins. Bill and legs black. Female



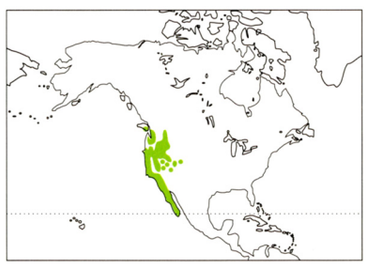
has crown and smaller crest brown; neck and throat white with black streaks. Immature has greater primary coverts tipped with buff. Races separated on colour tones, especially on breast, and wing length; *languens* has indistinct pale spotting on breast.
Habitat. Arid tropical thorn forest and scrub; common in second growth forest. Roosts above ground in thick brush or vines.
Food and Feeding. Seeds (especially legumes), fruits and insects. Often seen scratching and feeding along roads.
Breeding. Late Apr and May. Nests on ground. Clutch size 8-12 eggs (up to 20). Eggs white, averaging 33·9 x 23·9 mm. Incubation 22-23 days.
Movements. Presumably sedentary. Coveys of 6-20 birds observed.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Status not well known; total population might number c. 50,000-100,000 birds. Reported to be common in several areas in 1960's. Human activity has apparently been responsible for population increases in some areas.
Bibliography. Alden (1969), Alderton (1992), Blake (1953), Davis (1972), Edwards (1989), Escalante (1988), Johnsgard (1973, 1988), Leopold (1959), Miller (1905), Raethel (1988), Ridgway & Friedmann (1946), Robbins (1981), van Rossem (1945).

7. California Quail

Callipepla californica

French: Colin de Californie **German**: Schopfwachtel **Spanish**: Colín de California
Other common names: Valley Quail

Taxonomy. *Tetrao californicus* Shaw, 1798, Monterey, California, USA.
Often placed in *Lophortyx*. Sometimes considered conspecific with *C. gambelii*, with which forms superspecies. Eight subspecies recognized.
Subspecies and Distribution.
C. c. californica (Shaw, 1798) - N Oregon and W Nevada, NW USA, S to Los Coronados Is, Baja California, NW Mexico; also (probably introduced) from S British Columbia, SW Canada, SE to Colorado, WC USA.
C. c. orecta (Oberholser, 1932) - SE Oregon and extreme NE California, W USA.
C. c. brunnescens (Ridgway, 1884) - coastal N California to SC California, W USA; also (probably introduced) Vancouver I, Canada.
C. c. catalinensis (Grinnell, 1906) - Santa Catalina I, off SW California, W USA; also (probably introduced) nearby Santa Rosa and Santa Cruz Is.
C. c. canfieldae (van Rossem, 1939) - EC California, W USA.
C. c. plumbea (Grinnell, 1926) - S California, W USA, to N Baja California, NW Mexico.
C. c. decoloratus (van Rossem, 1946) - C & S Baja California, NW Mexico.
C. c. achrustera (Peters, 1923) - extreme S Baja California, W Mexico.
Introduced to Chile, Argentina, New Zealand, King I (Australia) and Hawaii.



Descriptive notes. 23-27 cm; male 176 g, female 162 g. Long black teardrop-shaped crest. Distinctive black and white pattern on face and throat separates from all except *C. gambelii*; differs from that species in having belly buff with black and brown feather tips, giving scaly pattern. Overall coloration blue-grey; crown chestnut; white streaking on flanks. Bill black, legs grey. Female has smaller crest; head and throat greyish with dark streaks. Immature has buff-tipped greater primary coverts. Races separated on general coloration, especially different tones of greyish or brownish back; also to some extent on size.
Habitat. Very diverse habitats, depending on area, and including brushland, chaparral, desert, evergreen forest, forest edge, grassland and agricultural land.
Food and Feeding. Mainly seeds and bulbs of *Lupinus*, *Lotus*, *Erodium*, *Trifolium*, *Medicago*, *Phoradendron*, *Salsola kali*, *Quercus*, *Hypochoeris* and barley; also takes green herbage. Scratches in litter for seeds; also plucks leaves from growing vegetation. Standing water needed.
Breeding. Early Apr (in S) or May-Jun (in N) to Jul-Aug. Nest is depression in ground lined with grass. Clutch size 13-17 (up to 28). Eggs creamy white with light brown splotches, averaging 31·6 x 24·1 mm. Incubation 22-23 days by female; male assists with brood rearing. Double-clutching reported. Low nest success, often of under 20%.
Movements. Sedentary; maximum movements recorded less than 27 km. Typically circulates in coveys of 25-40 birds, but up to 1000 seen together. Home range of 2-18 ha; smaller in summer, larger in winter.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Important gamebird in W USA, with over 2,000,000 harvested per year; however, has declined rather dramatically in USA since 1960. Grazing can have detrimental effects, but undergrazing in mesic areas also shown to have a negative impact on populations.
Bibliography. Anthony (1970), Barclay & Bergerud (1975), Bartholomew & Dawson (1958), Bartholomew & MacMillen (1961), Blake (1953), Blakely *et al.* (1990), Blus *et al.* (1985), Brown & Gutiérrez (1980), Chandler (1970), Church & Dailey (1993), Crawford (1978b), Crispens *et al.* (1960), Duncan (1968), Edwards (1989), Emlen (1939, 1940), Fjeldså & Krabbe (1990), Francis (1965, 1967, 1970), Genelly (1955), Glading (1938a, 1938b, 1941), Glading *et al.* (1945), Gullion & Christensen (1967), Gutiérrez (1980), Gutiérrez *et al.* (1983), Hill & Wiggins (1948), Howard & Emlen (1942), Johnsgard (1973), Johnson (1965), Jones (1969), Kilbride *et al.* (1992), Leopold (1959, 1977), Lever (1987), Lewin (1963, 1965), Linsdale (1936), McMillan (1964), Oates & Crawford (1983), Raitt (1960, 1961), Raitt & Genelly (1964), Shields & Duncan (1966), Stinnett & Klebenow (1986), Sumner (1935), Terres (1980), Williams, G.R. (1952), Williams, H.W. (1969), Zink *et al.* (1987).

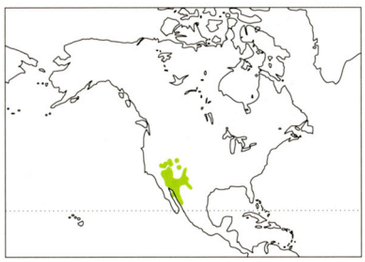
8. Gambel's Quail

Callipepla gambelii

French: Colin de Gambel **German**: Helmwachtel **Spanish**: Colín de Gambel
Other common names: Desert Quail

Taxonomy. *Lophortyx Gambelii* Gambel, 1843, west of California = south Nevada, USA.
Often placed in *Lophortyx*. Sometimes considered conspecific with *C. californica*, with which forms superspecies. Seven subspecies recognized.

Subspecies and Distribution.
C. g. gambelii (Gambel, 1843) - S Utah and Nevada, W USA, S to Baja California, NW Mexico.
C. g. sana (Mearns, 1914) - W Colorado, WC USA.
C. g. ignoscens (Friedmann, 1943) - S New Mexico and extreme W Texas, SC USA.
C. g. pembertoni (van Rossem, 1932) - Tiburon I, in Gulf of California, NW Mexico.
C. g. fulvipectus Nelson, 1899 - NC to SW Sonora, NW Mexico; possibly also SE Arizona and SW New Mexico, SW USA.
C. g. stephensi (Phillips, 1959) - S Sonora, NW Mexico.
C. g. friedmanni (Moore, 1947) - coastal and NW Sinaloa, NW Mexico.
Introduced (*gambelii*) to Idaho, NW USA.



Descriptive notes. 23-27 cm; male 161 g, female 156 g. Long black teardrop-shaped crest. Distinctive black and white pattern on face and throat separates from all except *C. californica*; differs from that species in having belly buff with black median patch. Overall coloration blue-grey; crown reddish brown; brown and white streaking on flanks. Bill black, legs grey. Female has smaller crest; head and throat greyish with dark streaks. Immature has buff-tipped greater primary coverts. Races separated on tone of grey on upperparts, and of buff on belly.
Habitat. Occurs in three types of desert: low warm desert valleys dominated by mesquite (*Prospsis*); upland warm deserts dominated by cat's claw (*Acacia*), yucca (*Yucca*), and prickly-pear cactus (*Opuntia*); and cool desert dominated by sagebrush (*Artemisia*). Also frequents irrigated agricultural habitats.
Food and Feeding. Takes wide variety of food types: mainly flowers and seeds; generally few insects, although more eaten by chicks. Plants most commonly recorded are deervetch (*Lotus*), filaree (*Erodium*), mesquite, and alfalfa (*Medicago*). Water apparently needed when succulent plants are not available.
Breeding. Late Apr-Aug. Nest is shallow depression concealed in grass or bush. Clutch size 12-14 (up to 19). Eggs white with purplish brown splotches, averaging 32·0 x 24·0 mm. Incubation 23 days, by female; male assists in rearing of brood. Double-brooding reported.
Movements. Sedentary; maximum movement recorded was under 16 km. Coveys average 12·5 birds, but up to 40. Home range c. 7-40 ha.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Total population numbers over 1,000,000 birds. Populations in USA stable since 1960's. Important gamebird in SW USA. Tolerant of conversion of desert to cropland, although heavy grazing can reduce populations. Status in Mexico poorly known, but probably secure.
Bibliography. Alden (1969), Beck *et al.* (1973), Blake (1953), Brown, D.E. (1989), Campbell (1957), Church & Dailey (1993), Edwards (1989), Ellis & Stokes (1966), Goldstein (1983, 1984), Gorsuch (1934), Gullion (1960, 1962), Hungerford (1962 1964), Johnsgard (1973, 1975), Leopold (1959), Lever (1987), Ligon (1961), Phillips (1958), Pitelka (1948), Raitt & Ohmart (1966, 1968), Ridgway & Friedmann (1946), van Rossem (1945), Sutton & Phillips (1942), Swank & Gallizioli (1954), Terres (1980), Vorhies (1928).

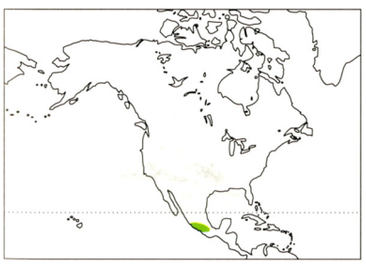
Genus *PHILORTYX* Gould, 1846

9. **Barred Quail**

Philortyx fasciatus

French: Colin barré **German**: Bindenwachtel **Spanish**: Colín Bandeado
Other common names: Banded Quail

Taxonomy. *Ortyx fasciatus* Gould, 1844, California; error, Mexico.
Monotypic.
Distribution. SW Jalisco to SE Guerrero, Morelos and Puebla, WC Mexico.



Descriptive notes. 18-21 cm; 115-160 g, with male averaging 130 g, female 126 g. Breast and belly white with black barring; overall coloration greyish brown to grey; head greyish brown, with white chin and throat. Straight black and brown crest, with rufous-tipped feathers. Bill black, legs brown. Female has shorter crest. Immature has black feathering on face, chin and throat.
Habitat. Arid and semi-arid tropical scrub, weed-bordered agricultural land, and overgrown pastures, from sea-level to over 1500 m. More common at lower elevations.
Food and Feeding. Mainly seeds of *Desmodium* and *Crotalaria*; also seeds of sunflower, thistles, corn cockle, *Croton* and cultivated beans and sesame. In addition, takes some insects, e.g. leaf beetles and larvae of Lepidoptera. Drinks water during dry season.
Breeding. Nesting in Aug and Sept. In captive birds: nest made of grass with partial roof; average clutch size 5·5 (3-7); eggs laid at intervals of 2 days; incubation 22·6 days (21-23). Eggs white, averaging 30·2 x 23·7 mm.
Movements. Sedentary. Often occurs in coveys of 5-20 birds; overall average covey size of 12 birds, but only 5·8 in Jun; in W Mexico, coveys of 10-40 in Guerrero, and 10-20 in Jalisco.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Total population may number under 100,000 birds, but thought to be stable. Limited range; very little information available. Potential threats include overgrazing and agricultural intensification. Hunting occurs in some areas.
Bibliography. Alderton (1992), Binford (1989), Blake (1953, 1977), Blake & Hanson (1942), Davis, L.I. (1972), Davis, W.B. (1944), Edwards (1989), Johnsgard (1973, 1988), Leopold (1959), Ridgway & Friedmann (1946), Schaldach (1963), Zimmerman & Harry (1951).

Genus *COLINUS* Goldfuss, 1820

10. **Northern Bobwhite**

Colinus virginianus

French: Colin de Virginie **German**: Virginiawachtel **Spanish**: Colín de Virginia
Other common names: Common Bobwhite, Bobwhite; Rufous-bellied Bobwhite (*pectoralis*); Masked Bobwhite (*ridgwayi*); Black-headed Bobwhite (*atriceps*)

Taxonomy. *Tetrao virginianus* Linnaeus, 1758, America = South Carolina, USA.
Sometimes considered conspecific with *C. nigrogularis*. Several races have at times been considered full species. Validity of race *nelsoni* questionable. Twenty-two subspecies recognized.
Subspecies and Distribution.
C. v. marilandicus (Linnaeus, 1758) - SE Maine to C Virginia, NE USA.
C. v. virginianus (Linnaeus, 1758) - Virginia to N Florida and W to Alabama, E USA.
C. v. floridanus (Coues, 1872) - peninsular Florida, E USA.
C. v. cubanensis (G. R. Gray, 1846) - Cuba and I of Pines.
C. v. mexicanus (Linnaeus, 1766) - E USA; W of *marilandicus* and E of *taylori*.
C. v. taylori Lincoln, 1915 - South Dakota to N Texas to W Missouri, C USA.
C. v. texanus (Lawrence, 1853) - SW Texas, USA, and Coahuila, Nuevo Leon and Tamaulipas, NE Mexico.
C. v. ridgwayi Brewster, 1885 - NC Sonora, Mexico; reintroduced to SE Arizona, SW USA, where extirpated in past.
C. v. maculatus Nelson, 1899 - C Tamaulipas to N Veracruz and SE San Luis Potosí, NE Mexico.
C. v. aridus Aldrich, 1942 - C Tamaulipas to SE San Luis Potosí, NE Mexico.
C. v. graysoni (Lawrence, 1867) - SE Nayarit and S Jalisco to Morelos, S Hidalgo and SC San Luis Potosí, C Mexico.
C. v. nigripectus Nelson, 1897 - Puebla, Morelos and México (state), Mexico.
C. v. pectoralis (Gould, 1843) - E slope of mountains of C Veracruz, E Mexico.
C. v. godmani Nelson, 1897 - lowland Veracruz, E Mexico.
C. v. minor Nelson, 1901 - NE Chiapas and adjacent Tabasco, S Mexico.
C. v. atriceps (Ogilvie-Grant, 1893) - extreme W Oaxaca, S Mexico.
C. v. thayeri Bangs & Peters, 1928 - NE Oaxaca, S Mexico.
C. v. harrisoni Orr & Webster, 1968 - SW Oaxaca, S Mexico.
C. v. coyolcos (P. L. S. Müller, 1776) - coast of E Oaxaca and N Chiapas, S Mexico.
C. v. nelsoni Brodkorb, 1942 - S Chiapas, Mexico.
C. v. salvini Nelson, 1897 - coast of S Chiapas, Mexico.
C. v. insignis Nelson, 1897 - S Chiapas, S Mexico, and Huehuetenango, W Guatemala.
Introduced to British Columbia (Canada), Puerto Rico, Hawaii, New Zealand and West Indies; also (*taylori*) to Washington, Oregon and Idaho, NW USA; may be introduced to I of Pines and Cuba, although this population usually awarded subspecific status.

Descriptive notes. 20-25 cm. Size increases from S to N: average 129 g (Chiapas); 159 g (San Luis Potosí); male 173 g, female 170 g (E USA). Lacks prominent crest. Extremely variable, both within and among races, with greatest variation on head and underparts; overall coloration involves combinations of grey, brown and white. Several races have white supercilium and black or brown eyeline, combined with white moustachial streak or all white throat; others have chin and throat blackish, with breast often blackish or brownish. Bill black, legs horn-coloured. Female lacks striking black and white facial patterns; head and throat mostly buff. Immature has greater primary coverts tipped buff. Races separated mainly on plumage, but also on size: pattern of white eyestripe bordered by black and white throat found in those of USA and some of Mexico.
Habitat. Varies with population; includes pine woodlands, woodland edge, shrubs, agricultural fields, pastures, rangeland and fallow fields.
Food and Feeding. In Mexico, primarily seeds of sunflowers, foxtails, panic grass, thistles, and *Desmodium*; oak acorns, and cultivated frijoles, corn, wheat and tomatoes. In Alabama, S USA, most important food is legume seeds. In several areas dominated by grassland, diet includes *Croton*, *Sesbania*, *Panicum*, *Ambrosia* and *Helianthus*. In agricultural areas, diet varies according to major crops, including corn, sorghum, oats, soybeans and wheat; also oak acorns. Insects important during summer.
Breeding. Variable in USA, with peak in Apr-Jun, earlier in S, later in N; Apr-Jun in Mexico, where possibly later in Oaxaca, to coincide with rainy season. Nest constructed in depression on ground and lined with dead vegetation; standing vegetation usually covers nest from above. Clutch size averages 12·5-14·4 eggs (10-15); clutch of 8 eggs in Oaxaca, S Mexico; generally fewer eggs in second clutches. Incubation 23 days. Nest success 20-40%. Eggs dull white, but can be stained; average 30 x 24 mm.
Movements. Sedentary, except during autumn dispersal. Normally forms coveys: on average of 12 birds (8-20) in Mexico; average 13·8 or 14·3 in USA, but up to 28 birds. Home range of as much as 25 ha, but usually under 10 ha.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. In USA, over 20,000,000 individuals per year killed by hunters. Populations in parts of the USA intensively studied and managed; however, populations in many areas declining, and contraction of range in NE USA; severe declines in traditional areas of SE USA. Mexican populations not well known and some subspecies could be threatened. Race *ridgwayi* considered endangered in USA, and subject to intensive restoration effort in Arizona; small population in Sonora, NW Mexico, could be threatened. Major threat in Mexico is overgrazing. Other potential threats include pesticides, in agricultural areas, and hunting. Subspecies *ridgwayi* on CITES I.
Bibliography. Aldrich (1946), Alvarez del Toro (1952), Bauer (1985), Binford (1989), Blake (1953, 1977), Brennan (1991b), Briggs (1954), Brodkorb (1943), Brown & Ellis (1977), Brown & Gutiérrez (1980), Burger (1993), Burger *et al.* (1990), Cain *et al.* (1982), Campbell-Kissock *et al.* (1984, 1985), Church & Dailey (1993), Church & Taylor (1992), Coggins (1986), Davis (1972), DeMaso *et al.* (1992), Dimmick (1975), Droge & Sauer (1990), Ellis, D.H. & Serafin (1977), Ellis, D.H. *et al.* (1978), Ellis, J.A. *et al.* (1969), Ellsworth & Roseberry (1988), Ellsworth *et al.* (1989), Escalante (1988), Gilpin (1982), Gilpin & Hungerford (1977), Griscom (1932), Guthery (1986), Guthery & Koerth (1992), Guthery *et al.* (1988), Gutiérrez *et al.* (1983), Hammerquist-Wilson & Crawford (1987), Johnson & Guthery (1988), Kabat & Thompson (1963), Kiel (1976), Klimstra & Roseberry (1975), Koerth & Guthery (1991), Landers & Johnson (1976), Landers & Mueller (1989), Lehmann (1953, 1984), Lever (1987), Ligon (1952, 1961), Lowery & Dalquest (1951), Lyon (1962), Marsden & Baskett (1958), McInteer (1986), McRae & Dimmick (1982), Morrison & Lewis (1972), Murphy & Baskett (1952), Murray & Frye (1957), O'Brien *et al.* (1985), Petrides & Nestler (1943), Pitelka (1948), Pollock, Moore *et al.* (1989), Pollock, Witerstein *et al.* (1989), Rice *et al.* (1993), Robel & Arruda (1986), Robel & Fretwell (1970), Roseberry & Klimstra (1984, 1992), Rosene (1969), van Rossem (1945), Rowley (1984), Schemnitz (1964), Schitoskey *et al.* (1982), Scott, T.G. (1985), Sermons & Speake (1987), Simms (1989), Skewes *et al.* (1988), Solomon & Robel (1980), Spears *et al.* (1993), Stauffer *et al.* (1990), Stettner *et al.* (1971), Stoddard (1931), Stokes (1967), Terres (1980), Tomlinson (1972a, 1972b, 1975, 1984), Urban (1959), Wetmore (1927), White *et al.* (1990), Wood *et al.* (1986).

PLATE 40

inches 6

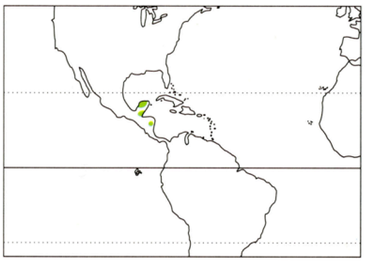
cm 15

11. Black-throated Bobwhite

Colinus nigrogularis

French: Colin à gorge noire **German**: Schwarzkehlwachtel **Spanish**: Colín Gorginegro
Other common names: Yucatan Bobwhite

Taxonomy. *Ortyx nigrogularis* Gould, 1843, Mexico = Belize.
Possibly conspecific with *C. virginianus*. Four subspecies recognized.
Subspecies and Distribution.
C. n. persiccus Van Tyne & Trautman, 1941 - Progreso area of Yucatán, SE Mexico.
C. n. caboti Van Tyne & Trautman, 1941 - N Campeche, Yucatán (except Progreso area) and N Quintana Roo, SE Mexico.
C. n. nigrogularis (Gould, 1843) - Belize and N Guatemala.
C. n. segoviensis Ridgway, 1888 - E Honduras and NE Nicaragua.



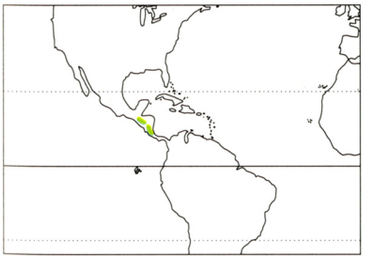
Descriptive notes. 18-21·5 cm; 126-144 g, with sexes apparently similar. Distinctive face pattern separates from congeners. Forehead, sides of head, and throat black; small crest and crown chestnut; white stripes above and below eye. Overall coloration is mixture of rufous, white and black. Back of neck and upper back cinnamon with rows of buff and white spots; back chestnut with grey feather margins, rump olive brown and grey, scapulars and upperwing-coverts cinnamon with grey, chestnut and black spots. Breast and belly white with rows of black "V"s; flanks white with brown and black feather margins. Bill black and legs brown or slate blue. Female has crown buff with rows of small black spots; sides of head and neck buff fading to whitish on throat; back and rump mottled olive brown with cinnamon and black "V"s; breast and belly light grey with small black "V"s becoming larger on belly. Immature has buff-tipped greater primary coverts. Races separated on size, plumage tone and extent of white spotting.
Habitat. Brush, woodland edge, forest openings with weeds, pine savannas and agricultural land. Apparently best habitat in areas where henequin is planted. During dry seasons often associated with standing water.
Food and Feeding. Known to take seeds, including *Desmodium*.
Breeding. Laying Apr-Aug or later; most reports of adults in breeding condition or clutches during Jun-Aug; newly-hatched chicks in Nov. Nest in hollow on ground lined with grass. Eggs pale buff to white, sometimes with small dark spots; size averages 30·5 x 22·7 mm.
Movements. Sedentary. Coveys of 12-20 birds reported.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Status not well known; total population may number 100,000-1,000,000 birds, and thought to be stable. Reported to be common in many areas, and has benefited from clearing of forest for agricultural land. However, population surveys and research on biology of species still needed.
Bibliography. Alderton (1992), Blake (1953, 1977), Davis (1972), Edwards (1989), Howell (1971), Johnsgard (1973, 1988), Klaas (1968), Land (1970), Lee (1966), Leopold (1959), Monroe (1968), Nelson (1932), Paynter (1955), Ridgway & Friedmann (1946), Russell (1964), Saunders *et al.* (1950), Smithe (1966), Stone (1890), Traylor (1941), Van Tyne (1935), Van Tyne & Trautman 1941).

12. Spot-bellied Bobwhite

Colinus leucopogon

French: Colin à face blanche **German**: Fleckenwachtel **Spanish**: Colín Gorgiblanco
Other common names: White-breasted Bobwhite (*hypoleucus*); Sclater's Bobwhite (*sclateri*); Dickey's Bobwhite (*dickeyi*)

Taxonomy. *Ortyx leucopogon* Lesson, 1842, San Carlos = la Unión, El Salvador.
Often considered conspecific with *C. cristatus*. Several races have at times been considered full species. Race *nicaraguae* no longer considered valid. Six subspecies recognized.
Subspecies and Distribution.
C. l. incanus Friedmann, 1944 - S Guatemala.
C. l. hypoleucus (Gould, 1860) - W El Salvador and adjacent Guatemala.
C. l. leucopogon (Lesson, 1842) - SE El Salvador and W Honduras.
C. l. leylandi (Moore, 1859) - NW Honduras.
C. l. sclateri (Bonaparte, 1856) - SW & C Honduras to NW Nicaragua.
C. l. dickeyi Conover, 1932 - NW & C Costa Rica.



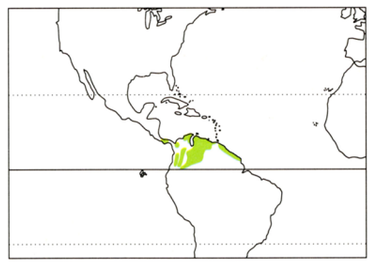
Descriptive notes. 19-23 cm; estimated weight of male 144 g, of female 115 g. Small crest olive brown with buff feather margins. Overall coloration mottled grey and dusky, also white. Distinctive face patterns separate from congeners. Plumage very variable, with head and underparts of two types: northern (*leucopogon* and N), with forehead, supercilium and throat, and in some races breast and belly, white; and southern (*leylandi* and S), with forehead black or brown, supercilium white or buff, throat brown with black border or black with white or buff border, hindneck spotted with black, and breast and belly reddish brown. Back and rump mottled grey and brown with black vermiculations. Bill black and legs bluish horn. Female similar, but throat buffy and spotted with black; breast and belly buff with black and tan streaks or bars. Immature similar to female. Races separated on plumage colours, especially of head and underparts.
Habitat. Arid lower tropical zone, including open pine forest, grassland, brush, woodland edges and agricultural land, at altitudes under 1800 m.
Food and Feeding. Small seeds, especially sacaton bunch grass and small buds in El Salvador. Seeds, fruits and insects in Costa Rica; sometimes feeds on beans and rice crops.
Breeding. Pairing in Apr, nesting generally May-Sept, although often later in El Salvador. Nests on ground in bowl of herbage under thick vegetation cover. Clutch size of 10 eggs in Costa Rica. Eggs white, averaging 31·1 x 25 mm.
Movements. Presumably sedentary. One covey of 8 birds observed; coveys of 3-15 birds in Costa Rica.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Status not well known; total population might number under 500,000 birds, but thought to be relatively stable. Reported common in many parts of range and range expansion reported. This species has benefited from activities of humans, especially through clear-cutting of forest and development of agriculture. Nevertheless, population surveys and research needed.
Bibliography. Alderton (1992), Blake (1977), Dickey & van Rossem (1938), Griscom (1932), Johnsgard (1988), Land (1970), Monroe (1968), Ridgway & Friedmann (1946), Saunders *et al.* (1950), Schönwetter (1967), Slud (1964), Stiles & Skutch (1989), Stone (1932), Wetmore (1965).

13. Crested Bobwhite

Colinus cristatus

French: Colin huppé **German**: Haubenwachtel **Spanish**: Colín Crestudo

Taxonomy. *Tetrao cristatus* Linnaeus, 1766, Mexico, Guiana = Curaçao.
Often considered conspecific with *C. leucopogon*. Race *leucotis* has been considered distinct species. Validity of several Venezuelan races possibly in question, due to overlapping distribution and lack of barriers. Nominate race sometimes subdivided, with recognition of race *continentis*. Type locality of species questionable. Thirteen subspecies recognized.
Subspecies and Distribution.
C. c. mariae Wetmore, 1962 - Chiriquí area, Panama.
C. c. panamensis Dickey & van Rossem, 1930 - Pacific slope of W Panama.
C. c. decoratus (Todd, 1917) - Caribbean coast of Colombia.
C. c. cristatus (Linnaeus, 1766) - NE Colombia and NW Venezuela, in and near Guajira Peninsula; Curaçao and Aruba, where possibly introduced.
C. c. littoralis (Todd, 1917) - N base of Santa Marta Mts, NE Colombia.
C. c. badius Conover, 1938 - Cauca Valley to W slope of Western Andes, W Colombia.
C. c. leucotis (Gould, 1844) - upper and middle sections of Magdalena Valley, and middle Sinú Valley, C Colombia.
C. c. bogotensis Dugand, 1943 - E Andes in Boyacá and Cundinamarca, NC Colombia.
C. c. parvicristatus (Gould, 1843) - C Colombia (E slope of E Andes in Boyacá and Cundinamarca, through Meta and *llanos*) to SC Venezuela (NW Bolívar and N Amazonas).
C. c. horvathi (Madaràsz, 1904) - Andes of Mérida, NW Venezuela.
C. c. barnesi Gilliard, 1940 - Portuguesa and Barinas, WC Venezuela.
C. c. mocquerysi (Hartert, 1894) - Sucre, N Monagas and N Anzoátegui, NE Venezuela.
C. c. sonnini (Temminck, 1815) - Carabobo and Caracas, NC Venezuela, S through Orinoco Basin and Guianas to N Brazil.
Introduced (*sonnini*) to Mustique, Grenadines, St Thomas and Virgin Is.



Descriptive notes. 18-21·5 cm; male 132-153 g, female 131-141 g (Surinam). Prominent crest separates from congeners, although size variable with race; crown and crest white to buff. Overall coloration mottled grey, brown and black. Side of head, throat and eyeline rufous; hindneck and ring around throat white with black and cinnamon spots; back and rump mottled grey and brown; wing feathers with buff margins; breast and belly cinnamon with black, white and buff spots. Bill black, legs horn. Female has shorter, darker brown crest; plumage mottled brown and buff, with black and brown streaks. Immature spotted brown and white on breast and belly; greater primary coverts tipped buff. Races differ mainly in tone of plumage and length of crest; also some variation in size.
Habitat. Arid lowlands, and locally into subtropical zone, using thickets, woodland edges, savanna, roadsides and embankments; also agricultural fields (of rice and sugarcane, or pastures). Generally under 1500 m, but up to 3200 m in Colombia.
Food and Feeding. Mainly seeds, but also insects during wet season in Venezuela. Most important plants include *Euphorbia*, *Hyptis*, Mimosaceae, *Phaseolus*, *Brachiaria*, *Digitaria*, *Paspalum* and *Hachelochloa*; also feeds on sesame and sorghum. In Brazil, adapted to life alongside humans and will come to houses to feed.
Breeding. Apr/May-Oct/Nov, corresponding to wet season in Venezuela; adults in breeding condition Jul-Sept in Colombia, where chick seen in Feb. 8-16 eggs in Venezuela; up to 15 eggs in Colombia. Eggs cream-coloured, often heavily spotted or blotched with brown; size averages 40 x 30 mm. Incubation 22-23 days.
Movements. Presumably sedentary. Pairs and coveys up to 12 birds in Surinam, and of 10-15 birds in Venezuela.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Status not well known; total population might number over 1,000,000 birds. Apparently common in many areas, and range expansion reported. Very common in some major river valleys of Colombia. Has recently spread into lowlands of Golfo Dulce, in SW Costa Rica. However, highland races in Colombia uncommon and local. Species has generally benefited from activities of humans, especially from clear-cutting of forest and development of agriculture. Potential threats include pesticides, in agricultural areas, and hunting.
Bibliography. Blake (1977), Borrero (1972), Darlington (1931), Espinoza (1982, 1983), Fjeldså & Krabbe (1990), Gines & Alveledo (1958), Haverschmidt (1968), Hilty & Brown (1986), Johnsgard (1988), Mendez (1979), Mendoza (1982a, 1982b), Meyer de Schauensee (1964), Meyer de Schauensee & Phelps (1978), Miller (1963), Monroe (1968), Morales (1977a, 1977b, 1980), Morales & Pacheco (1976), Peters (1934), Pinto (1964), Ridgely & Gwynne (1989),

On following pages: 14. Marbled Wood-quail (*Odontophorus gujanensis*); 15. Spot-winged Wood-quail (*Odontophorus capueira*); 16. Black-eared Wood-quail (*Odontophorus melanotis*); 17. Rufous-fronted Wood-quail (*Odontophorus erythrops*); 18. Black-fronted Wood-quail (*Odontophorus atrifrons*); 19. Chestnut Wood-quail (*Odontophorus hyperythrus*); 20. Dark-backed Wood-quail (*Odontophorus melanonotus*).

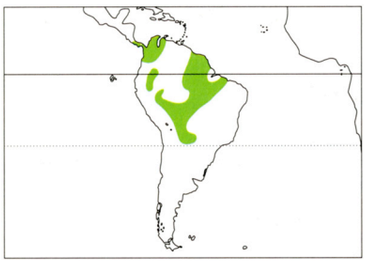
Ridgway & Friedmann (1946), Ruschi (1979), Schäfer & Phelps (1954), Schönwetter (1967), Sick (1985a, 1993), Snyder (1966), Stiles & Skutch (1989), Tostain *et al.* (1992), Wetmore (1927, 1963, 1965).

Genus *ODONTOPHORUS* Vieillot, 1816

14. Marbled Wood-quail
Odontophorus gujanensis

French: Tocro de Guyane **German**: Marmorwachtel **Spanish**: Corcovado Común

Taxonomy. *Tetrao gujanensis* Gmelin, 1789, Cayenne.
Eight subspecies recognized.
Subspecies and Distribution.
O. g. castigatus Bangs, 1901 - SW Costa Rica and (?formerly) W Panama.
O. g. marmoratus (Gould, 1844) - E Panama to N Colombia and NW Venezuela.
O. g. gujanensis (Gmelin, 1789) - SE Venezuela, Guianas and Brazil (S to Mato Grosso) and extreme N Paraguay.
O. g. medius Chapman, 1929 - S Venezuela and NW Brazil.
O. g. buckleyi Chubb, 1919 - base of E Andes of Colombia, E Ecuador and N Peru.
O. g. rufogularis Blake, 1959 - upper reaches of R Yavari, NE Peru.
O. g. pachyrhynchus Tschudi, 1844 - E Peru and possibly also W Bolivia.
O. g. simonsi Chubb, 1919 - E Bolivia.

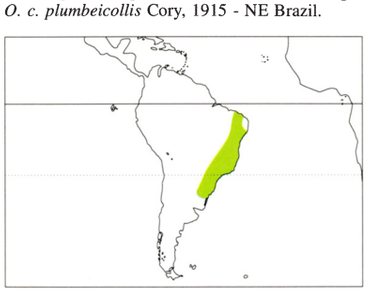


Descriptive notes. 23-29 cm; male 313-380 g, female 298 g. Bare eye-ring of red or orange skin distinctive. Plumage lacks any striking patterns; overall coloration brown and grey, although highly variable. Crown and crest reddish brown with dark vermiculations; sides of head and throat chestnut, rufous or grey. Back and rump brown or grey with black vermiculations; scapulars and upperwing-coverts brown or grey, with black and buff spots; breast and belly grey, brown or medially tawny, with black and white barring or spots. Bill and legs bluish black or grey. Female slightly smaller, but otherwise similar. Immature has less vermiculation and orange-red bill. Races vary somewhat in general coloration, especially of sides of head.
Habitat. Lowland tropical and subtropical forest up to 1800 m. Found on forest floor in rain forest and in old second growth.
Food and Feeding. Berries and Myriopoda (Diplopoda) in Surinam; starchy seeds and invertebrates, e.g. millipedes, ants, cockroaches, spiders and beetles, in Panama; and dried bananas and possibly insects in Costa Rica.
Breeding. Nests found in Jan, Apr and Jun; breeding female collected in Costa Rica in Aug. Duetting reported. Nests are chambered with roofs of dead vegetation, apparently placed at base of trees or amongst roots; nest 28 cm long, 13 cm wide. Clutch size of 4 eggs (2 nests); incubation 24-28 days, apparently only by female. Chicks seen with coveys of 5-6 adults. Eggs white or white with brown spots, measuring 35·0-40·5 x 26·6-28·6 mm.
Movements. Presumably sedentary. Groups of 6-8 birds, possibly referring to families.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population may number over 1,000,000 birds, but possibly declining. Reported to be common in Amazon region of SE Peru, but possibly uncommon elsewhere. Apparently rare to locally common in Panama, although scarce near human settlement due to hunting. Scarce in Costa Rica, except where forest is intact. Race *castigatus* probably extirpated in Panama, and found only in restricted area in Costa Rica. Major threats include deforestation and hunting; however, with extensive distribution, probably more secure than most *Odontophorus*.
Bibliography. Blake (1977), Borrero (1972), Chapman (1917, 1926), Dubs (1992), Gines & Aveledo (1958), Haverschmidt (1968), Hilty & Brown (1986), Johnsgard (1979, 1988), Mendez (1979), Meyer de Schauensee (1964), Meyer de Schauensee & Phelps (1978), Miller (1963), Parker *et al.* (1982), Petrides (1942), Phelps & Phelps (1958), Pinto (1964), Remsen & Traylor (1989), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Ruschi (1979), Sick (1985a, 1993), Skutch (1947b, 1983a), Slud (1964), Snyder (1966), Stiles & Skutch (1989), Terborgh *et al.* (1984), Tostain *et al.* (1992), Wetmore (1965).

15. Spot-winged Wood-quail
Odontophorus capueira

French: Tocro uru **German**: Capueirawachtel **Spanish**: Corcovado Urú

Taxonomy. *Perdix capueira* Spix, 1825, Rio de Janeiro and Minas Gerais.
Validity of race *plumbeicollis* questionable. Two subspecies recognized.
Subspecies and Distribution.
O. c. capueira (Spix, 1825) - E Brazil, E Paraguay, extreme NE Argentina.
O. c. plumbeicollis Cory, 1915 - NE Brazil.

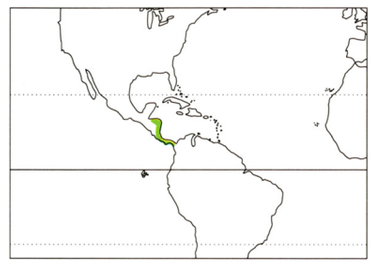


Descriptive notes. 26·5-29 cm; estimated weight of male 457 g, of female 396 g. Bright red bare eye-ring and eyelid. Sides of head, malar region, chin, throat, breast and belly plain grey; overall colour brown to grey. Crest and crown chestnut; forehead and supercilium tawny. Back brown, with white shaft streaks; scapulars chestnut, with white shaft streaks; rump tawny with black spots; flight-feathers black with white spots. Bill black, legs grey-black. Female similar, but slightly more slender. Immature has wider shaft streaks on back; black spots on rump coarser, breast grey and belly reddish brown. Race *plumbeicollis* has underparts paler with buff tone; supercilium and white shaft streaks on upper back are rather less prominent.
Habitat. Atlantic lowland tropical forest, including second growth forest. Found on forest floor.
Food and Feeding. Berries, especially *Phytolacca decandra*; also nuts of *Araucaria* on forest floor.
Breeding. Aug-Nov. Nests on ground, sometimes in armadillo holes. In captivity: domed nest of 40 x 50 cm was constructed; 5 eggs laid; eggs hatched after incubation period of 26-27 days. Incubation reported as 18-19 days in wild. Eggs white, often stained yellow or red; average size 40·1 x 29·1 mm.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population might number under 50,000 birds, and declining. Much reduced in interior of Brazil, and now restricted mainly to protected Atlantic coastal forests; populations of NE Brazil appear to be those most at risk. Reported common in some places where habitat protected. Major threats include deforestation and hunting. Very few recent records from Argentina and Paraguay. Extensive surveys required. Some 26 birds known to be held in captivity.
Bibliography. Alderton (1992), Blake (1977), Carvalho (1940), Dubs (1992), Flieg (1970b), Johnsgard (1979, 1988), de Magalhães (1977), de la Peña (1992), Pinto (1952a, 1964), Ruschi (1979), Sick (1985a, 1993).

16. Black-eared Wood-quail
Odontophorus melanotis

French: Tocro à face noire **German**: Schwarzohrwachtel **Spanish**: Corcovado Orejinegro

Taxonomy. *Odontophorus melanotis* Salvin, 1865, Tucurrique, Costa Rica.
Often considered race of *O. erythrops*. Birds of Panama formerly awarded separate race, *coloratus*.
Two subspecies recognized.
Subspecies and Distribution.
O. m. verecundus Peters, 1929 - Caribbean slope of Honduras.
O. m. melanotis Salvin, 1865 - SE Honduras, Nicaragua and Caribbean coast of Costa Rica and Panama.

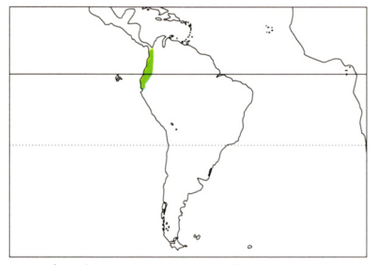


Descriptive notes. 22-28 cm; estimated weight of male 340 g, of female 329 g. Very similar to *O. erythrops*, but lacks white jugular band. Bare ring around eye purple; overall coloration can be dark brown or blackish with rufous breast. Crown, crest and face chestnut; throat and foreneck brownish black. Back and rump black or olive with cinnamon vermiculations; scapulars black, or olive with black spots; belly tawny. Bill black, legs blue-black. Female similar, but sides of head darker and duller chestnut, and eye-ring blue-black. Immature similar, but with duller crest; back has white or buffy shaft streaks, belly spotted and barred with black. Race *verecundus* has upperparts greyer.
Habitat. Tropical and lower subtropical forests at 450-1600 m, locally to sea-level. Found on forest floor in virgin forest and in thick second growth.
Food and Feeding. No information available.
Breeding. Nest found in excavation between buttresses of tree in Costa Rica. Clutch 4 eggs. Eggs cream or white with brown spots, averaging 37·6 x 27·9 mm.
Movements. Presumably sedentary. Found singly, in pairs, or in small groups; groups of up to 10 birds in Costa Rica.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Safe. Total population might number under 50,000 birds, and declining. Restricted range; very little information available. Becoming scarce and local in Costa Rica. Major threats include deforestation, and possibly hunting. Extensive surveys required.
Bibliography. Alderton (1992), Blake (1977), Howell (1971), Johnsgard (1979, 1988), Mendez (1979), Monroe (1968), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Slud (1964), Stiles & Skutch (1989), Wetmore (1965).

17. Rufous-fronted Wood-quail
Odontophorus erythrops

French: Tocro à front roux **German**: Rotstirnwachtel **Spanish**: Corcovado Frentirrojo
Other common names: Rufous-breasted Wood-quail

Taxonomy. *Odontophorus erythrops* Gould, 1859, Pallatanga, Ecuador.
Often considered to include *O. melanotis*. May be conspecific with three other species, *O. speciosus*, *O. hyperythrus* and *O. melanonotus*. At other extreme, race *parambae* has been considered distinct species. Two subspecies normally recognized.
Subspecies and Distribution.
O. e. parambae Rothschild, 1897 - Pacific slope of Colombia S to W Ecuador; possibly also E Panama.
O. e. erythrops Gould, 1859 - SW Ecuador.



Descriptive notes. 23-28 cm; estimated weight of male 340 g, of female 329 g. Very similar to *O. melanotis*, but has white jugular band. Bare ring around eye purple; overall coloration can be dark brown or blackish with rufous breast. Crown, crest and face rufous; throat and foreneck black. Back and rump black or olive, with cinnamon vermiculations; scapulars black or olive with black spots; breast and belly dark rufous. Bill black, legs blue-black. Female similar, but sides of head darker and duller chestnut, and eye-ring blue-black. Immature similar, but with duller crest; back with white or buffy shaft streaks, belly spotted and barred with black. Race *parambae* somewhat darker.
Habitat. Humid lowland tropical forest at elevations under 1600 m. Found on forest floor.
Food and Feeding. No information available.

Breeding. No information available.
Movements. Presumably sedentary. One group of 7 individuals observed.
Status and Conservation. Not globally threatened. Mace-Lande: probably Safe. Very little information available; total population might number under 500,000 birds; apparently declining. Common in some areas in Colombia. Major threats include deforestation, and possibly hunting. Some cause for concern in W Andes of Colombia, due to deforestation at lower altitudes; most protected areas and parks are concentrated at higher elevations. Extensive surveys required.
Bibliography. Alderton (1992), Blake (1977), Borrero (1972), Carriker (1910), Chapman (1926), Hilty & Brown (1986), Johnsgard (1979, 1988), Mendez (1979), Meyer de Schauensee (1964), Negret (1991), Ridgway & Friedmann (1946), Robbins *et al.* (1985), Wetmore (1965).

18. **Black-fronted Wood-quail**

Odontophorus atrifrons

French: Tocro à front noir **German**: Schwarzstirnwachtel **Spanish**: Corcovado Carinegro

Taxonomy. *Odontophorus atrifrons* Allen, 1900, Santa Marta, Colombia.
May be conspecific with four other species, *O. strophium*, *O. columbianus*, *O. leucolaemus* and *O. dialeucos*. Three subspecies recognized.
Subspecies and Distribution.
O. a. atrifrons Allen, 1900 - Santa Marta Mts, NE Colombia.
O. a. variegatus Todd, 1919 - N end of E Andes, NE Colombia.
O. a. navai Aveledo & Pons, 1952 - Perijá Mts, NE Colombia and NW Venezuela.

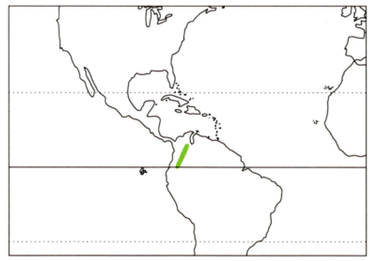
Descriptive notes. 25-27 cm; estimated weight of male 311 g, female 298 g. Black forehead, face and throat distinctive; crown rufous brown. Overall coloration blackish brown. Back grey with black vermiculation, becoming browner towards the rump; wings mottled with cinnamon and black; flight-feathers tipped black, but showing white of feather shafts. Bill black, legs dusky horn coloured. Female similar, but underparts more rufescent. Immatures have brownish red upper mandible, and black feathers on throat, tipped with tawny olive. Races differ in extent of black and in overall coloration.
Habitat. Montane tropical and subtropical forests at 1200-3100 m. Found on forest floor.
Food and Feeding. No information available.
Breeding. Male in breeding condition and female laying in Aug; immature found during Jul in Perijá Mts, NW Venezuela.
Movements. Presumably sedentary. Occurs in groups of up to 10 individuals.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Vulnerable. Currently considered near-threatened. Total population might number under 10,000 birds, and declining. Restricted range; very little information available. Possibly common in large protected area in Santa Marta Mts, NE Colombia. Race *navai* protected in Sierra de Perijá National Park, NW Venezuela. Major threats include deforestation, mineral extraction, and possibly hunting. Extensive surveys required.
Bibliography. Alderton (1992), Blake (1977), Borrero (1972), Fjeldså & Krabbe (1990), Gines & Aveledo (1958), Hilty & Brown (1986), Johnsgard (1979, 1988), Meyer de Schauensee (1964), Meyer de Schauensee & Phelps (1978), Phelps & Phelps (1958), Schwartz & Lentino (1984), Todd & Carriker (1922).

19. **Chestnut Wood-quail**

Odontophorus hyperythrus

French: Tocro marron **German**: Kastanienwachtel **Spanish**: Corcovado Castaño

Taxonomy. *Odontophorus hyperythrus* Gould, 1858, Santa Fé de Bogotá, Colombia.
May be conspecific with three other species, *O. speciosus*, *O. erythrops* and *O. melanonotus*. Possibly most closely related to *O. speciosus*. Some evidence of differences in plumage colour between populations of W and C Andes. Monotypic.
Distribution. Endemic to C and W Andes of Colombia.



Descriptive notes. 25-28·5 cm; estimated weight of male 392 g, female 351 g. Overall coloration chestnut to dark brown; feathers around eye and ear-coverts white. Head chestnut, foreneck and breast rufous; back, rump and wings mainly brown; upperwing-coverts spotted white; back and rump with fine black vermiculations. Bill black, legs bluish grey. Female similar, but much of breast and belly dark grey. Juvenile similar to adults, but upperwing-coverts and scapulars tipped buff; orange-red tip to bill.
Habitat. Montane subtropical forests at 1600-2700 m, including second growth and forest borders; normally found on forest floor. Some evidence of use of coffee plantations with shade trees. Has been seen roosting in trees.
Food and Feeding. Consumes seeds and berries, and possibly also insects. Forages by scratching in leaf litter for roots, seeds and fruits which have fallen from trees.
Breeding. Generally unknown; laying thought to be during Apr-May, based on gonad development.
Movements. Presumably sedentary. Groups of 3-9 individuals reported.
Status and Conservation. Not globally threatened. Mace-Lande: Vulnerable. Currently considered near-threatened. Total population may number under 10,000 birds, and in decline. Restricted range; very little information available. Populations occur in some protected areas including Las Orquideas, Los Nevados, Cueva de los Guácharos, Munchique and Farallones National Parks. Possibly common at Acaime, in Salento. Major threats include deforestation and possibly hunting. Populations of C Andes apparently more at risk, as more intensive deforestation has resulted in fragmentation and isolation of populations; some populations do appear to persist in small forest fragments. In W Andes, some conversion of forest habitat to pine plantations, with unknown effects on species. Survey work required.
Bibliography. Alderton (1992), Blake (1955, 1977), Borrero (1972), Chapman (1917), Collar & Andrew (1988), Fjeldså & Krabbe (1990), Hilty (1985), Hilty & Brown (1986), Johnsgard (1979, 1988), Meyer de Schauensee (1964), Miller (1963), Negret (1991), Renjifo (1988), Uribe (1986).

20. **Dark-backed Wood-quail**

Odontophorus melanonotus

French: Tocro à dos noir **German**: Schwarzrückenwachtel **Spanish**: Corcovado Dorsioscuro
Other common names: Black-backed Wood-quail

Taxonomy. *Odontophorus melanonotus* Gould, 1860, Ecuador.
May be conspecific with three other species, *O. hyperythrus*, *O. erythrops* and *O. speciosus*. Probably most closely related to *O. speciosus*. Monotypic.
Distribution. Mountains of NW Ecuador and SW Colombia.

Descriptive notes. 24-27 cm; estimated weight of male 226 g, of female 220 g. Overall colour brownish black; throat and breast reddish chestnut, becoming darker below; brownish black eye-ring. Crown and sides of head, back, rump, wings and belly brownish black with fine chestnut vermiculations. Bill black, legs brownish black. Female identical. Immature dull brown, with reddish bill and greenish grey legs.
Habitat. Lower subtropical forest at altitudes of 1200-1500 m.
Food and Feeding. No information available.
Breeding. No information available.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Vulnerable. Currently considered near-threatened. Total population might number under 10,000 birds, with trends unknown. Restricted range; very little information available. Recently found to be common in well protected reserve of La Planada, SW Colombia. Major threats include deforestation, and possibly hunting. Survey work required.
Bibliography. Alderton (1992), Blake (1977), Chapman (1926), Fitzpatrick & Willard (1982), Hilty & Brown (1986), Johnsgard (1979, 1988), Robbins (1981), Schönwetter (1967).

PLATE 41

inches 6

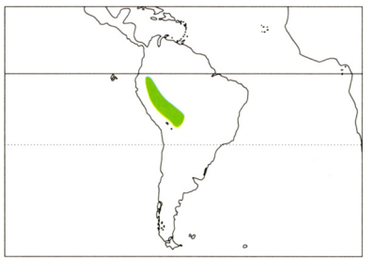
cm 15

21. Rufous-breasted Wood-quail

Odontophorus speciosus

French: Tocro à poitrine rousse **German**: Rotbrustwachtel **Spanish**: Corcovado Pechirrufo

Taxonomy. *Odontophorus speciosus* Tschudi, 1843, Peru.
May be conspecific with three other species, *O. hyperythrus*, *O. erythrops* and *O. melanonotus*. Possibly most closely related to *O. hyperythrus*. Three subspecies recognized.
Subspecies and Distribution.
O. s. soederstroemii Lönnberg & Rendahl, 1922 - E & S Ecuador.
O. s. speciosus Tschudi, 1843 - EC Peru.
O. s. loricatus Todd, 1932 - SE Peru to E Bolivia.



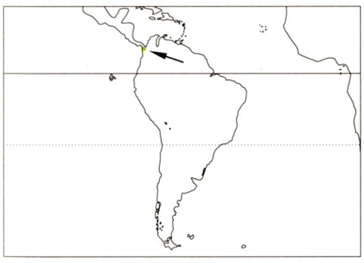
Descriptive notes. 25-26·5 cm; estimated weight of male 332 g, of female 302 g. Breast and belly rufous chestnut; crown dark brown, bordered by black on sides of head and neck, and on throat. Overall coloration brown and chestnut. Ear-coverts brown; white line extending from bill over eye down side of neck; bare eye-ring bluish black. Back and rump brown, with fine black vermiculations and white feather shafts; upperwing-coverts spotted with either black or white, and with white feather shafts. Bill black, legs bluish black. Female similar, but rufous chestnut ends on upper breast, and replaced by grey on lower breast and belly. Immature has sides of head, chin and throat chestnut, with dusky margins; white stripe on head narrower; back and rump with reduced shaft stripes; longer scapulars tipped with rufous buff. Races separated on coloration, especially of crown and sides of head.
Habitat. Tropical lowland forest at elevations under 1700 m. Found on forest floor.
Food and Feeding. No information available.
Breeding. No information available.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population might number over 500,000 birds, and possibly stable. Reported to be uncommon in Peru, but fairly common in Podocarpus National Park, S Ecuador. Possible threats include deforestation and perhaps hunting; however, probably more secure than most *Odontophorus*, due to remote distribution. Surveys and research required.
Bibliography. Alderton (1992), Blake (1977), Chapman (1926), Davis (1986), Johnsgard (1979, 1988), Parker *et al.* (1982), Raethel (1988), Remsen & Traylor (1989), Robbins (1981), Terborgh & Weske (1975), Traylor (1958).

22. Tacarcuna Wood-quail

Odontophorus dialeucos

French: Tocro de Panama **German**: Tacarcunawachtel **Spanish**: Corcovado del Tacarcuna

Taxonomy. *Odontophorus dialeucos* Wetmore, 1963, Darién, Panama.
May be conspecific with four other species, *O. columbianus*, *O. atrifrons*, *O. leucolaemus* and *O. strophium*. Probably most closely related to *O. strophium*. Monotypic.
Distribution. Endemic to extreme E Panama and adjacent Chocó, NW Colombia.



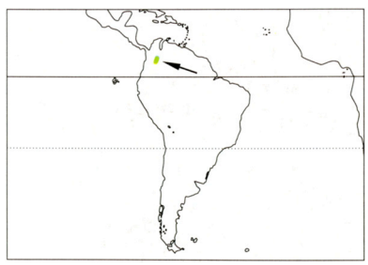
Descriptive notes. 22-25 cm; estimated weight of male 264 g, of female 258 g. Crown black; separated from black throat by white supercilium, lores and chin. Overall coloration dark or olive-brown. Sides and back of neck cinnamon; back and rump olive brown, with fine black vermiculation; breast and belly chestnut, with fine white specks. Bill black, legs brownish black. Female similar, but paler. Immature similar to female, but with less white on chin, and broader black band on foreneck.
Habitat. Subtropical forest at 1050-1450 m. Found on forest floor.
Food and Feeding. No information available.
Breeding. Virtually no information; immature collected in June.
Movements. Presumably sedentary. Occurs in pairs or in groups of up to 8 individuals.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Safe. Currently considered near-threatened. Total population might number under 50,000 birds. Restricted range; very little information available. Threats may include deforestation and hunting. Additional surveys required in Chocó, NW Colombia, to determine status of recently discovered population. Research required.
Bibliography. Alderton (1992), Blake (1977), Hilty & Brown (1986), Johnsgard (1979, 1988), Mendez (1979), Pearman (1993b), Ridgely & Gwynne (1989), Robbins (1981), Rodríguez (1982), Wetmore (1963, 1965).

23. Gorgeted Wood-quail

Odontophorus strophium

French: Tocro à miroir **German**: Kragenwachtel **Spanish**: Corcovado Gorgiblanco

Taxonomy. *Ortyx* (*Odontophorus*) *strophium* Gould, 1844, Colombia.
May be conspecific with four other species, *O. columbianus*, *O. atrifrons*, *O. leucolaemus* and *O. dialeucos*. Monotypic.
Distribution. Endemic to W slope of E Andes of Colombia, where restricted to two areas in departments of Santander and Cundinamarca.
Descriptive notes. 25·5-27 cm; estimated weight 302 g. Black band across foreneck, separating white throat from white upper breast; crown and eyeline brown; cheeks and supercilium white. Overall coloration brownish. Lower breast brown, with rows of white spots ending before rufous belly; back mottled with thin white streaks; scapulars spotted black. Bill and legs black. Female



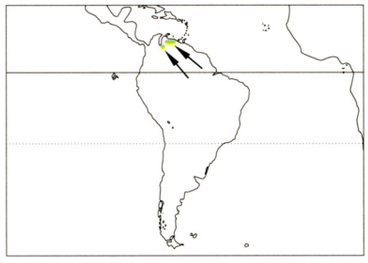
similar, but grey below, and rows of white spots on breast much reduced. Immature has more brownish grey on breast and sides; white spots on breast reduced to streaks.
Habitat. Montane temperate and subtropical forests at 1500-2050 m, especially those dominated by *Quercus humboldtii*. Found on forest floor. Will use second growth forest.
Food and Feeding. Feeds on fruits and seeds, including *Quercus humboldtii*, *Trigonobalanus*, *Cavendishia guatapensis* and *C.* cf. *nitida*, *Macleania rupestris*, *Miconia theaezans*, *Myrica pubescens*, *Rapanea ferruginea*, *Ficus boyacensis*, and *Norantea mixta*; also known to take arthropods.
Breeding. Breeding season apparently coincides with peaks of annual rainfall during Mar-May and Sept-Nov (based on several adults collected in breeding condition, and immatures collected in Dec). No further information available.
Movements. Presumably sedentary. Occurs in small groups of 1-3 birds.
Status and Conservation. VULNERABLE/RARE. Mace-Lande: Endangered. Total population thought to number under 2500 birds, and still declining. Restricted range, encompassing area only c. 280 km long at maximum; very little information available. Major threats include deforestation, and hunting. Cachalú Wildlife Sanctuary of 10,000 ha established at Guanentá-Alto Río Fonce in temperate forests in vicinity of Virolín, Santander; efforts under way to consolidate reserve and set up research projects. No recent evidence of populations in Cundinamarca, where few forest patches remain, and species last recorded in 1923.
Bibliography. Alderton (1992), Blake (1977), Borrero (1972), Brooke (1988), Chapman (1917), Collar & Andrew (1988), Collar *et al.* (1992), Fjeldså & Krabbe (1990), Hilty (1985), Hilty & Brown (1986), Johnsgard (1979, 1988), King (1978/79), Kuroda (1970), Meyer de Schauensee (1964), Romero-Zambrano (1983).

24. Venezuelan Wood-quail

Odontophorus columbianus

French: Tocro du Venezuela **German**: Venezuelawachtel **Spanish**: Corcovado Venezolano

Taxonomy. *Odontophorus columbianus* Gould, 1850, Caracas, Venezuela.
May be conspecific with four other species, *O. strophium*, *O. atrifrons*, *O. leucolaemus* and *O. dialeucos*. Monotypic.
Distribution. Endemic to NC Venezuela.



Descriptive notes. 28-30 cm; estimated weight of male 343 g, of female 336 g. Overall coloration reddish brown with pale streaks on upperwing-coverts; throat and chin white with black streaks. Large white droplets on breast, belly and flanks. Bill black, legs dark grey. Female lacks pale streaks on closed wing and has much reduced white droplets on underside. Juvenile shows lesser development of pale streaks and white spots; bill orange.
Habitat. Montane subtropical cloud forests at altitudes of 1100-2400 m. Found on forest floor. Has been seen roosting above ground on palm fronds.
Food and Feeding. Little information. Consumes seeds, fruits, insects and worms. Forages by scratching litter to expose soil; also scrapes into soil, apparently to feed on fleshy roots.
Breeding. From Mar perhaps to end of Jul. One chambered nest with roof of vegetation found at base of palms. One clutch of 6 eggs. Eggs white, measuring 40·5-43·5 mm x 29·0-29·5 mm. Incubation 30 days.
Movements. Presumably sedentary. During Jan, singles, pairs and groups of up to 9 birds observed.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Vulnerable. Currently considered near-threatened. Total population might number under 10,000 birds, and declining. Restricted range; very little information available. Populations occur in some protected areas, including San Esteban National Park. Possibly still common in some protected areas; more than a dozen groups recorded at Rancho Grande, Henri Pittier National Park, during survey in Jan 1994. Major threats include deforestation, hunting and urbanization. Research and surveys required.
Bibliography. Alderton (1992), Blake (1977), Fjeldså & Krabbe (1990), Gines & Alveledo (1958), Johnsgard (1979, 1988), Laskowski *et al.* (1992), Meyer de Schauensee & Phelps (1978), Phelps & Phelps (1958), Schäfer (1953b), Schäfer & Phelps (1954), Schwartz & Lentino (1984), Zimmer & Phelps (1954).

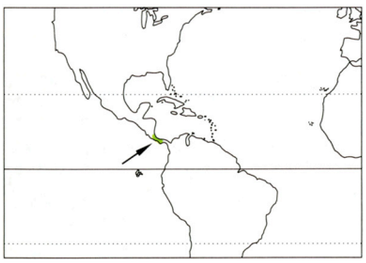
25. Black-breasted Wood-quail

Odontophorus leucolaemus

French: Tocro à poitrine noire **German**: Weißkehlwachtel **Spanish**: Corcovado Pechinegro
Other common names: White-throated Wood-quail

Taxonomy. *Odontophorus leucolaemus* Salvin, 1867, Cordillera de Tolé, Veraguas, Panama.
May be conspecific with *O. strophium*, *O. atrifrons*, *O. colombianus* and *O. dialeucos*. Proposed race *smithianus*, from Dota Mts of Costa Rica, generally considered a melanistic morph. Monotypic.
Distribution. NE, E & C highlands of Costa Rica S to W Panama. Most records on Caribbean slope.
Descriptive notes. 22-25·5 cm; estimated weight of male 226 g, of female 220 g. Crown, crest and ear-coverts black; large white patch on throat; neck and breast black with dull-white feather tips. Overall coloration dark brown. Belly brown with fine black vermiculations. Iris brown, bill black, legs dark grey. Sexes similar. Juvenile browner on breast; bill brown or red. Population of Dota Mts (Costa Rica) smaller and almost entirely black.
Habitat. Tropical and subtropical forests at 800-1850 m, including second growth and forest borders, but mostly in interior of forest. Found on forest floor, generally in thickest vegetation, e.g. in scrub and amongst vines.
Food and Feeding. Virtually no information available: may take plant matter, supplemented with insects.

On following pages: 26. Stripe-faced Wood-quail (*Odontophorus balliviani*); 27. Starred Wood-quail (*Odontophorus stellatus*); 28. Spotted Wood-quail (*Odontophorus guttatus*); 29. Singing Quail (*Dactylortyx thoracicus*); 30. Montezuma Quail (*Cyrtonyx montezumae*); 31. Ocellated Quail (*Cyrtonyx ocellatus*); 32. Tawny-faced Quail (*Rhynchortyx cinctus*).



Breeding. Nests found in Jun. Nests in heavily shaded second growth along bank of stream; nest is hollow in leaf litter, measuring 24 x 13 cm. Clutches of 5 eggs. Eggs white, but become stained brown; 44·5 x 28·7 mm. Incubation said to be 16-17 days. Apparently groups of adults guard nest-site, but do not assist with incubation.
Movements. Presumably sedentary. Moves about in pairs or groups of 10-15 birds.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Safe. Currently considered near-threatened. Total population might number under 50,000 birds; perhaps declining. Restricted range; very little information available. Generally rare in Costa Rica, although locally common; most records from Panama are old. Isolated population in Dota Mts, Costa Rica. Reported to be common at Monteverde Reserve, Puntarenas, Costa Rica. Major threats possibly include deforestation and hunting. Extensive surveys required.
Bibliography. Alderton (1992), Blake (1958, 1977), Carriker (1910), Johnsgard (1979, 1988), McDonald & Winnett-Murray (1989), Mendez (1979), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Slud (1964), Stiles & Skutch (1989), Wetmore (1965).

26. **Stripe-faced Wood-quail**

Odontophorus balliviani

French: Tocro de Ballivian **Spanish**: Corcovado Enmascarado
German: Streifengesichtwachtel

Taxonomy. *Odontophorus Balliviani* Gould, 1846, Cochabamba, Bolivia. Monotypic.
Distribution. Endemic to E Andes of SE Peru, and N & W Bolivia, in La Paz and Cochabamba.

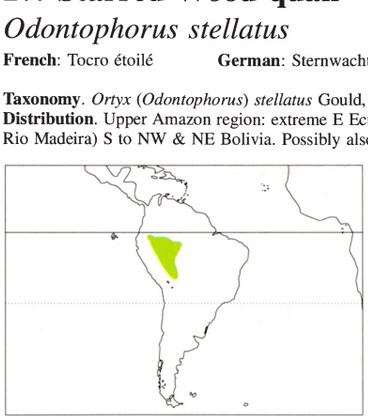
Descriptive notes. 26-28 cm; estimated weight of male 311 g, of female 324 g. Crest and crown chestnut bordered by buff; eye-ring red, with black stripe behind eye extending along edge of nape. Overall coloration brown. Buff throat, with lines of white streaks becoming diamond-shaped spots; bordered by black on breast, belly and flanks. Ground colour of breast and belly brown; back and rump brown, mottled with black vermiculations; scapulars and wings brown, with black and chestnut spots. Bill black, legs dark lead. Female very similar, but may have fewer white streaks on throat. Immature not described.
Habitat. Montane subtropical forest at 2000-3000 m; found in heavy forest, stunted cloud forest, clearings and boggy meadows.
Food and Feeding. No information available.
Breeding. Egg size 38 x 26·8 mm.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Safe. Total population might number under 50,000 birds; perhaps in decline. Restricted range; very little information available. Threats possibly include deforestation, urbanization and agriculture. Rarely reported in wild, but inhabits areas with difficult access. Reported to be uncommon in Peru. Surveys required to evaluate populations and delimit distribution.
Bibliography. Alderton (1992), Blake (1977), Fjeldså & Krabbe (1990), Johnsgard (1979, 1988), Parker *et al.* (1982), Remsen & Traylor (1989), Robbins (1981), Schönwetter (1967).

27. **Starred Wood-quail**

Odontophorus stellatus

French: Tocro étoilé **German**: Sternwachtel **Spanish**: Corcovado Estrellado

Taxonomy. *Ortyx* (*Odontophorus*) *stellatus* Gould, 1843, Brazil. Monotypic.
Distribution. Upper Amazon region: extreme E Ecuador, E Peru and W Brazil (S of Amazon, E to Rio Madeira) S to NW & NE Bolivia. Possibly also occurs in extreme SE Colombia.



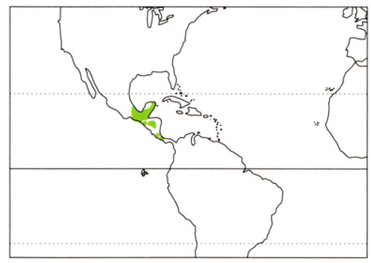
Descriptive notes. 24-26 cm; estimated weight of male 358 g, of female 315 g. Large crest rufous chestnut; head and neck ash grey; yellow eye-ring; sometimes has white flecking on supercilium. Overall colour brown to rufous. Back brown to rufous, fading to buff on rump, with fine black vermiculations; scapulars with black spots and white feather shafts; upperwing-coverts tipped white. Breast chestnut-rufous, but paler medially; sparse white diamonds, like teardrops, on sides of breast. Bill and legs black. Female similar, but crest darker brown or brownish black. Immature similar, but bill reddish orange to yellow.
Habitat. Lowland tropical forest.
Food and Feeding. No information available.
Breeding. No information available.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population might number over 750,000 birds. Reported to be fairly common in Peru. Possible threats include deforestation and possibly hunting; however, isolated distribution probably makes it more secure than most other membrs of *Odontophorus*. Research required.
Bibliography. Alderton (1992), Blake (1977), Chapman (1921, 1926), Gyldenstolpe (1945, 1951), Hilty & Brown (1986), Johnsgard (1979, 1988), Parker *et al.* (1982), Pinto (1964), Remsen & Traylor (1989), Robbins (1981), Ruschi (1979), Sick (1985a), Terborgh & Weske (1975), Terborgh *et al.* (1984), Traylor (1958).

28. **Spotted Wood-quail**

Odontophorus guttatus

French: Tocro tacheté **German**: Tropfenwachtel **Spanish**: Corcovado Goteado

Taxonomy. *Ortyx guttata* Gould, 1838, Bay of Honduras = Belize.
Proposed race *matudae* known only from one location, and not normally considered valid. Monotypic.
Distribution. S Mexico (S México State to Yucatán) and Belize through N Guatemala and W & C Honduras into bordering Nicaragua; two further small populations, one in N Costa Rica, and one in S Costa Rica and adjacent W Panama.



Descriptive notes. 23-26·5 cm; average male 300 g, female 288 g. Polymorphic in both sexes, with brown and red morphs. Brown morph has crown blackish brown with orange crest; sides of head and neck cinnamon; throat black with white streaks; breast and belly brown with white spots, round or like teardrops. Overall coloration brown. Back and rump dark brown, with white feather shafts and black and buff mottling. Bill and legs dull green or black. Red morph differs mainly in reddish brown breast. Female similar, but crest blackish. Immature has rusty red crest, and breast markings more in form of streaks than of spots; bill orange-red.
Habitat. Tropical and subtropical montane forests at 500-3000 m, although locally to lower elevations, e.g. to 100 m in Costa Rica. Found on forest floor with sparse understorey and also older second growth. In Costa Rica reported from forest edge and up to tree-line.
Food and Feeding. Small bulbs, rootlets, flesh of large nuts and insects, including pupae and larvae (of Diptera, Coleoptera). Food obtained by scratching forest litter in circles up to 30 cm in diameter to reach bare ground. In captivity, will eat fruits, softened and hard grain, and dried beans.
Breeding. Nesting possibly May-Jun in Yucatán, Mexico; young chicks in May in Chiapas, S Mexico, and Guatemala; male in breeding condition from Belize in Mar; "well grown young" collected in Mexico during Dec. Nests on ground. Eggs white, sometimes with brown spots; size 39·2-40·5 x 28·5-29·7 mm.
Movements. Presumably sedentary; might undertake altitudinal migrations in Costa Rica. Circulates in coveys of 6-20 birds in Mexico, but only 1-4 just prior to breeding; groups of 4-10 birds in Costa Rica; larger coveys are apparently not family groups.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population might number under 500,000 birds, possibly declining. Apparently common in many parts of range. Major threats include deforestation, and possibly hunting. Although found in small and rather isolated populations, apparently more capable of withstanding habitat destruction and fragmentation than other members of *Odontophorus*.
Bibliography. Alvarez del Toro (1952), Binford (1989), Blake (1953, 1958, 1977), Briggs (1954), Brodkorb (1943), Carriker (1910), Davis (1972), Edwards (1989), Edwards & Lea (1955), Griscom (1932), Johnsgard (1973, 1979, 1988), Land (1970), Leopold (1959), Lowery & Dalquest (1951), Mendez (1979), Monroe (1968), Paynter (1955), Pitelka (1948), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Russell (1964), Saunders *et al.* (1950), Slud (1964), Smithe (1966), Stiles & Skutch (1989), Traylor (1941), Van Tyne (1935), Wetmore (1965).

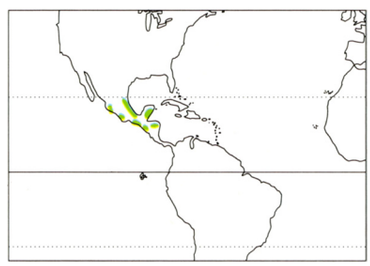
Genus *DACTYLORTYX* Ogilvie-Grant, 1893

29. **Singing Quail**

Dactylortyx thoracicus

French: Colin chanteur **German**: Singwachtel **Spanish**: Colín Cantor
Other common names: Long-toed Quail/Partridge

Taxonomy. *Ortyx thoracicus* Gambel, 1848, Jalapa, Veracruz, Mexico.
As many as ten races of doubtful validity. Seventeen subspecies normally recognized.
Subspecies and Distribution.
D. t. pettingilli Warner & Harrell, 1957 - SE San Luis Potosí and SW Tamaulipas, CE Mexico.
D. t. thoracicus (Gambel, 1848) - NE Puebla and C Veracruz, EC Mexico.
D. t. devius Nelson, 1898 - Jalisco, WC Mexico.
D. t. melodus Warner & Harrell, 1957 - C Guerrero, SC Mexico.
D. t. ginetensis Warner & Harrell, 1957 - SE Oaxaca and W Chiapas, S Mexico.
D. t. edwardsi Warner & Harrell, 1957 - W Chiapas, S Mexico.
D. t. chiapensis Nelson, 1898 - C Chiapas, S Mexico.
D. t. moorei Warner & Harrell, 1957 - mountains of C Chiapas, S Mexico.
D. t. dolichonyx Warner & Harrell, 1957 - Sierra Madre de Chiapas, Chiapas, S Mexico.
D. t. sharpei Nelson, 1903 - SE Mexico (Campeche, Yucatán and Quintana Roo) and N Guatemala; possibly also Belize.
D. t. paynteri Warner & Harrell, 1955 - SC Quintana Roo, SE Mexico.
D. t. calophonus Warner & Harrell, 1957 - W Guatemala.
D. t. salvadoranus Dickey & van Rossem, 1928 - Volcán de San Miguel, El Salvador.
D. t. taylori van Rossem, 1932 - Mt Cacaguatique, El Salvador.
D. t. fuscus Conover, 1937 - Tegucigalpa Department, Honduras.
D. t. rufescens Warner & Harrell, 1957 - San Juancito Mts, Honduras.
D. t. conoveri - Warner & Harrell, 1957 - Olancho Department, Honduras.



Descriptive notes. 20-23 cm; male 180-266 g, female 168-206 g. Toes and claws very long. Overall coloration grey and brown with white streaks. Crown dark brown, collar buff with black spots; supercilium, chin, sides of neck and throat tawny orange; black streak extending from back of eye to collar. Back and wings mottled grey and brown, with white shaft streaks; rump olive brown or grey with black vermiculations. Breast and belly greyish brown with white streaks, lower belly white. Bill blackish brown, legs plumbeous. Female similar, but sides of head grey fading to white on throat; breast and flanks paler brown. Immature similar but sides of head more cinnamon-buff in males and less ochraceous in females. Races separated on coloration and size: darker birds from montane forests, paler ones from more arid areas; largest individuals found in populations occurring in mountains, whereas smallest found near sea-level in Yucatán.
Habitat. Variable depending on population: subtropical montane and cloud forests at 1000-3000 m; in Yucatán Peninsula, locally to lower altitudes in deciduous scrub. Observed to be common in forests of oak and sweet gum. Found on forest floor with sparse understorey, and also in older second growth; especially at edges of old growth and clear-cut areas. Found in coffee plantations in El Salvador.

Food and Feeding. Small bulbs and seeds, e.g. pokeweed (*Phytolacca*), and insects including centipedes, crickets, fly larvae, grasshoppers and grubs. May eat coffee beans. Very strong feet and long claws allow food to be obtained by scratching in forest litter and soil.
Breeding. Season may extend from Feb to Oct: birds in breeding condition found during late Mar and Apr; in Yucatán, SE Mexico, nest found during May, and young chicks during Jul and Aug; young chicks in Tamaulipas, E Mexico during Apr; downy chick during Jul in Guatemala. Song distinctive and duetting reported. Clutch of 5 eggs found in Yucatán, where broods of 2-4. Eggs white with yellow markings, averaging 29-31 x 23·5-25 mm.
Movements. Presumably sedentary.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population may number 100,000-500,000 birds. Appears to be locally common in many parts of range. Threats include deforestation, and possibly hunting and grazing in forests. Although found in small and rather isolated populations, apparently more capable of withstanding habitat destruction and fragmentation than other quails of Central and South America. Extensive surveys required.
Bibliography. Alderton (1992), Baepler (1962), Banks (1987), Binford (1989), Blake (1953, 1977), Davis (1972), Dickey & van Rossem (1938), Edwards (1989), Edwards & Lea (1955), Griscom (1932), Harrell (1951), Johnsgard (1973, 1988), Land (1970), LeFebvre & LeFebvre (1958), Leopold (1959), Monroe (1968), Paynter (1955), Ridgway & Friedmann (1946), Saunders *et al.* (1950), Schaldach (1963), Schönwetter (1967), Smithe (1966), Sutton & Pettingill (1942), Warner & Harrell (1957).

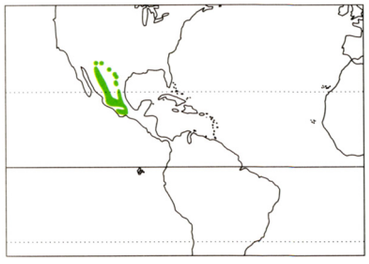
Genus *CYRTONYX* Gould, 1844

30. Montezuma Quail

Cyrtonyx montezumae

French: Colin arlequin **German**: Montezumawachtel **Spanish**: Colín de Moctezuma
Other common names: Harlequin Quail; Mearns Quail (*mearnsi*); Salle's Quail (*sallei*)

Taxonomy. *Ortyx Montezumae* Vigors, 1830, Mexico.
May be conspecific with *C. ocellatus*, with which forms superspecies. Race *sallei* sometimes considered full species. Five subspecies recognized.
Subspecies and Distribution.
C. m. mearnsi Nelson, 1900 - scattered populations in S USA (W & C Texas, S New Mexico and S Arizona) and N & NW Mexico. Also reported from Nayarit, CW Mexico.
C. m. montezumae (Vigors, 1830) - Tamaulipas S through Hildago to Oaxaca, E Mexico; sometimes claimed not to occur in Oaxaca.
C. m. merriami Nelson, 1897 - Mt Orizaba, Veracruz, EC Mexico.
C. m. sallei J. Verreaux, 1859 - S Michoacán, Guerrero and W Oaxaca, S Mexico.
C. m. rowleyi Phillips, 1966 - Guerrero and Oaxaca (Sierra de Miahuatlán), Mexico.



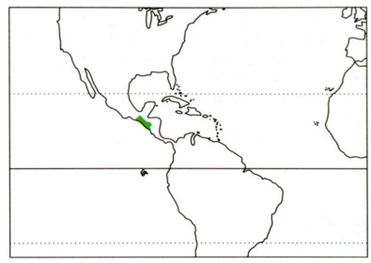
Descriptive notes. 20-22 cm; average in Mexico, male 195 g and female 176 g, but in Arizona, USA, male 209 g and female 193 g. Very distinctive head pattern; heavy spotting on flanks distinguishes from *C. ocellatus*. Crest tan, head mostly blackish, with forecrown stripe, orbital and postorbital areas, sides of neck and part of throat white; throat black medially, as is malar region. Overall coloration greyish to olive brown, combined with black and white. Hind neck and back olive brown with buff streaks; rump greyish, with white feather shafts, and brown and black barring; scapulars and upperwing-coverts olive brown, with black barring and tan streaks. Sides of breast and belly black with large white, cinnamon or rufous brown dots; breast medially brown, turning to black on belly. Bill bluish grey, legs grey. Female has crown and small crest buffy with black spots; sides of head white with tan streaks, throat white; back, rump and wings olive brown, with buff shaft streaks and black spots; breast and belly tan with black streaks, medially fading to white or buff streaks on side. Immature resembles female, but young males acquire black belly. Races separated on coloration: *merriami* lacks white band behind black throat; *mearnsi* has upperwing greyish; *sallei* intermediate between nominate *montezumae* and *C. ocellatus*.
Habitat. Open pine and oak woodlands, pure oak woodlands and oak grasslands at 1060-3000 m. Found on forest floor and in thick brush.
Food and Feeding. Primarily bulbs and tubers during dry periods, and insects during wet season. In Mexico, bulbs of *Cyperus esculentus* most common, but also bulbs of *Oxalis*, *Brodiaea* and *Echeandia terniflora*; also seeds and fruits of legumes, wheat, corn, *Physalis*, *Kalmia latifolia*, *Arbutus*, *Juniperus*, *Pinus cembroides*, *Rhus*, *Quercus virginiana* and *Helianthus*. Animal foods include Hymenoptera, Diptera, Lepidoptera, Coleoptera, Homoptera, Orthoptera, Isoptera, Araneida, and Chilopoda. Similar in Arizona, USA, with *Oxalis* and *Cyperus* most important items. Most noted for stout legs and long claws for digging up tubers and bulbs. Standing water apparently not needed.
Breeding. In Arizona, pairing Mar-May and nesting late Jun-Sept, apparently coinciding with summer rain. Domed nests constructed with lining of grasses or oak (*Quercus*) leaves, and roofed with grasses; 15 cm diameter and 10 cm high. Average clutch 11·1 eggs (6-14); eggs white, although often stained, averaging 32 x 25 mm. Incubation 25-26 days; males reported incubating eggs and assisting with rearing of brood.
Movements. Sedentary. Occurs in coveys of 7-8 birds, rarely up to 25. Home range of up to 50 ha, but usually under 6 ha.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Total population may number over 500,000 birds. Populations and range in USA declining, as result of overgrazing; but overall population in USA stable since 1960's. Possible threats include deforestation and hunting. In Mexico, overgrazing possibly detrimental; in Arizona, USA, grazing of over 55% of vegetation can eliminate a population; in Texas, USA, grazing of 40-50% of tall grasses results in extirpation. Better studied in USA than in Mexico. Race *sallei* (sometimes considered full species) currently considered near-threatened. Races *mearnsi* and *montezumae* on CITES II.
Bibliography. Albers & Gehlbach (1990), Alden (1969), Bailey (1928), Bent (1932), Binford (1989), Bishop (1964), Bishop & Hungerford (1965), Blake (1953), Briggs (1954), Brown, D.E. (1989), Brown, R.L. (1969, 1982), Campbell (1934), Church & Dailey (1993), Edwards (1989), Escalante (1988), Fleming & Baker (1963), Fuertes (1903), Glass & Potter (1944), Gorsuch (1934), Johnsgard (1973, 1975, 1988), Leopold (1959), Leopold & McCabe (1957), Ligon (1927, 1961), Martin *et al.* (1951), Miller, L. (1943), Miller, W. (1905), Petrides (1942), Phillips (1966), Pitelka (1948), Ridgway & Friedmann (1946), Robertson (1932), van Rossem (1945), Rowley (1966, 1984), Schaldach (1963), Sorola (1986), Stokes & Williams (1971), Stromberg (1990), Sutton & Phillips (1942), Swarth (1909), Terres (1980), Urban (1959), Vorhies (1928), Wallmo (1954), Willard (1913).

31. Ocellated Quail

Cyrtonyx ocellatus

French: Colin ocellé **German**: Tränenwachtel **Spanish**: Colín Ocelado

Taxonomy. *Ortyx ocellatus* Gould, 1837, unknown = Guatemala.
May be conspecific with *C. montezumae*, with which forms superspecies. Possible race *differens* described from Honduras, but not usually considered valid. Monotypic.
Distribution. S Mexico, through W Guatemala, E El Salvador and Honduras to N Nicaragua.



Descriptive notes. 19-23 cm; estmated weight of male 218 g, of female 182 g. Very distinctive head pattern; unlike *C. montezumae*, spotting on sides of upper breast fades away on flanks; breast and sides cinnamon, with grey tips on sides. Crown and hindneck olive brown; sides of head and neck bluish grey; orbital and postorbital areas, side of neck and part of throat white; throat medially black, as is malar region. Overall coloration grey, brown and cinnamon. Back, rump, scapulars and upperwing-coverts grey and brown with cinnamon streaks and black spots, fading to chestnut streaks and black spots towards rear; primaries with white spots; belly black. Bill black to pale blue, legs grey. Female has brown crown with black spots; less extensive white on head, with black feather tips; malar region and side of head tawny, with black streaks rather than bluish grey; back, rump, scapulars and upperwing-coverts brown, with black vermiculations and buff stripes; breast and belly vinaceous, with black streaks along feather shafts. Immature most like female, but young males have more white on throat and some black on belly.
Habitat. Open pine and oak woodlands and brushy fields at 750-3050 m. Found on forest floor and in thick brush.
Food and Feeding. Most likely similar to *C. montezumae*, especially in use of *Oxalis*.
Breeding. Nesting season possibly Apr-Aug in Guatemala. Egg size 32·3 x 25·1 mm.
Movements. Apparently sedentary. Coveys of about a dozen birds reported.
Status and Conservation. Not globally threatened. Mace-Lande: possibly Safe. Currently considered near-threatened. Total population may number under 50,000 birds, and declining. Restricted range; very little information available. Said to be rare in S Mexico in early 1970's, perhaps as result of habitat deterioration due to overgrazing. Current threats may include deforestation, hunting and overgrazing. In S Mexico, birds of this species often kept as pets in cages. Surveys required.
Bibliography. Alderton (1992), Alvarez del Toro (1952), Binford (1989), Blake (1953, 1977), Briggs (1954), Davis (1972), Dickerman (1987b), Dickey & van Rossem (1938), Edwards (1989), Edwards & Lea (1955), Griscom (1932), Johnsgard (1973, 1988), Land (1970), Leopold (1959), Monroe (1968), Ridgway & Friedmann (1946), Saunders *et al.* (1950), Thurber *et al.* (1987).

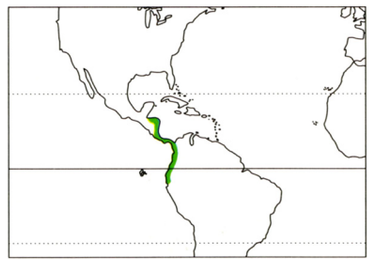
Genus *RHYNCHORTYX* Ogilvie-Grant, 1893

32. Tawny-faced Quail

Rhynchortyx cinctus

French: Colin ceinturé **German**: Langbeinwachtel **Spanish**: Colín Carirrufo
Other common names: Banded Wood-quail

Taxonomy. *Odontophorus cinctus* Salvin, 1876, Veraguas, Panama.
Birds of E Panama have been separated into race *hypopius*, but this division not normally accepted. Three subspecies recognized.
Subspecies and Distribution.
R. c. pudibundus Peters, 1929 - NE Honduras and E Nicaragua.
R. c. cinctus (Salvin, 1876) - Caribbean coast of Costa Rica and Panama.
R. c. australis Chapman, 1915 - Pacific coast of Colombia & Ecuador.



Descriptive notes. 17-20 cm; male 165 g. Forehead, sides of head, and malar region rufous; black streak through eye to side of neck. Overall coloration grey and brown. Crown and hindneck dark brown; neck and upper breast grey; back and rump fading from grey to brown with black streaks; scapulars and coverts mottled with black and cinnamon, and white shaft streaks; lower breast and belly tawny buff, fading to white between legs. Bill and legs bluish grey. Female generally browner, with dark brown crown, head and neck; white eyeline, chin and throat; white streaks on side of head; back and upper breast brown, rump mottled brown and chestnut, with small white spots; scapulars and upperwing-coverts olive and brown, with large black spots, small white spots, and white feather shafts; lower breast and belly with black barring along front and sides. Immature male resembles female but darker and less brown above. Races differ in plumage tone, *pudibundus* generally paler, *australis* darker.
Habitat. Lowland tropical forest at elevations under 1410 m. Most commonly found on forest floor.
Food and Feeding. Seeds, worms and insects recorded. Tends to peck with bill rather than scratch in litter.
Breeding. Female with developed egg collected during Mar, and downy young during Mar and Apr in Panama. Eggs white, measuring 29·6-30·0 x 23·5-23·8 mm.
Movements. Presumably sedentary. Usually found in pairs, but groups of up to 8 birds reported.
Status and Conservation. Not globally threatened. Mace-Lande: Safe. Very little information available; total population may number under 500,000 birds, perhaps declining. Apparently common in parts of Colombia, but rare and local in other areas. Rare and local in Panama, and no definite reports in W Panama. Major threats possibly include deforestation and hunting. Extensive surveys required.
Bibliography. Alderton (1992), Blake (1977), Borrero (1972), Chapman (1917, 1926), Hilty & Brown (1986), Howell (1971), Johnsgard (1988), Karr (1971), Mendez (1979), Meyer de Schauensee (1964), Monroe (1968), Olivares (1957), Ridgely & Gwynne (1989), Ridgway & Friedmann (1946), Robbins *et al.* (1985), Schönwetter (1967), Slud (1964), Stiles & Skutch (1989), Wetmore (1963, 1965).